

BULLETIN

OF

THE NEW YORK STATE COLLEGE OF FORESTRY
AT SYRACUSE UNIVERSITY
HUGH P. BAKER, *Dean*

Roosevelt Wild Life Bulletin

VOLUME 6

NUMBER 1

OF THE

Roosevelt Wild Life Forest Experiment Station



A BIOLOGICAL RECONNAISSANCE OF THE
PETERBORO SWAMP AND THE
LABRADOR POND AREAS

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The History

The collection at ESF honors President Theodore Roosevelt and is a legacy of the Roosevelt Wild Life Forest Experiment Station that was established as a memorial to him in May 1919 after his death. The aim of the station was to investigate forest wildlife, including habitats, life histories, methods of propagation, and scientific management while promoting a wide public interest in natural history through both outdoor and laboratory study. This mission truly matched President Roosevelt's beliefs.



"All grant that he [Theodore Roosevelt] was a statesman, a scholar, a hunter, and a field natural-ist. He was a field-naturalist first, and later became a scholar and statesman. He never outgrew his first love for wild nature and wild things of the field and forest. This knowledge of nature was the fertile soil upon which grew his conservation plans."

Dr. Charles C. Adams
First director of the experiment station

For further information, please contact:

Roosevelt Wildlife Collection
215 Illick Hall
SUNY College of Environmental Science and Forestry
Syracuse, NY 13210-2788
(315) 470-6763


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Text and Design: Roopal Rawal



Roosevelt Wildlife Collection




State University of New York
College of Environmental Science and Forestry
Syracuse, New York

The Roosevelt Wildlife Collection at the State University of New York's College of Environmental Science and Forestry (ESF) in Syracuse, a vertebrate collection containing around 10,000 specimens of birds, mammals, freshwater and marine fish, reptiles and amphibians, is the fourth largest in New York State. Although the collection has received donations from private collectors, much of the Roosevelt Wildlife Collection has been gathered through research activities of the faculty and staff at the College. The collection benefits ESF students and faculty as well as the general community in Syracuse through its research projects, loans to off-campus organizations such as Burnet Park Zoo, and through public service such as answering people's queries about wildlife including snakes, bats, animal bones, and other wildlife field signs.



Larry VanDruff (left), professor of Environmental and Forest Biology, and Ronald Giegerich, curator of the collection, examine individual specimens from the avian collection.

Collection Today

The collection that exists today in ESF's Illick Hall is a result of efforts by scientists, students and private collectors over seven decades to become a major educational resource of the College. Fully mounted specimens displayed at various places on the College's campuses are a part of this collection.

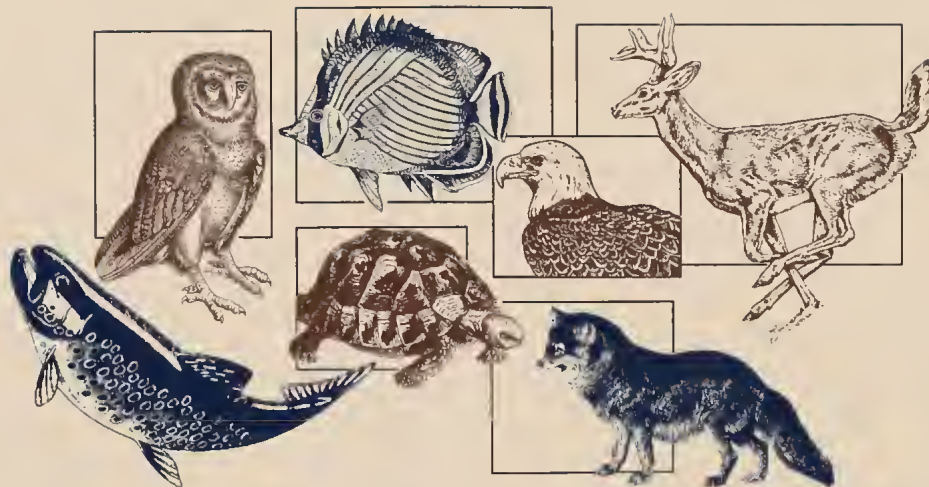
The large vertebrate collection includes skins, skulls, skeletons, scats, mounted and preserved specimens, eggs, nests and wings. The oldest items were collected more than 100 years ago.

The Roosevelt Wildlife Collection contains both teaching and reference materials. The teaching collection supports courses in vertebrate anatomy, taxonomy, physiology, herpetology, ornithology and mammalogy and related courses that are offered at ESF. The resident curator frequently offers instruction in specimen preservation and museum techniques for ESF students.

The reference collection is used primarily by faculty and graduate students to make identifications and for other purposes connected with their research and study projects. The collection also serves as a reference for public queries and is not used for demonstration and display purposes without thorough safeguards.

The bird skin collection contains several donated private collections totaling more than 1,500 specimens. One collection of bird skins was prepared by G. B. Sudworth of Kalamazoo, Michigan, between 1876 and 1883. The Steinbrenner collection from Constableville, New York dates to 1883-85.

Today the Roosevelt Wildlife avian collection includes some 400 life-like, mounted specimens. Three extinct species--the passenger pigeon, the heath hen and the ivory-billed woodpecker--are among its most important specimens.



The Roosevelt Wildlife mammal collection was built from field research on small mammals of New York. Through trades and acquisitions, it now includes representatives of many of the families of mammals of North America. Several exotic mammal specimens are added annually through donations including striking examples such as the Asiatic lion and Himalayan tahr indigenous to Asia, the Hamadrayas baboon of Africa, the three-toed sloth of South America, and the ring-tailed lemur of Madagascar. Today, there are more than 2,700 mammal specimens in the collection.

The freshwater and marine fish collection continues to grow as ESF scientists collect fish from throughout New York and even from other countries for study and deposit in the collection. Most recently, a marine fish collection from the waters off Australia has been added to the collection. The Roosevelt Wildlife Collection fish section also obtains fishes from areas of environmental concern to provide a database for future study on animal occurrences as well as effects of environmental pollutants.

The amphibian and reptile collection includes sea turtles, alligators, rattlesnakes and much more. Most species found in the Northeastern United States are well represented in the collection of some 600 specimens.

Systematic Records

The Roosevelt Wildlife Collection is housed according to relationships, from the most primitive to the most advanced. Thus, the most primitive bird in North America, the common loon, appears in the first cabinet of bird specimens. The records of the collection are kept by dates of acquisition. Information about the order, family, genus, species, and sub-species of each specimen also is recorded.

A project to create a computer database from all the field notes and catalog data from 1919 to the present is under way. The database stores information about dates of collection, geographical location, habitat, weather, methods of capture and preservation, and the names of individuals who collect and identify each species and

those who incorporate them into the collection. The recently-acquired MUSE--a data management system designed for vertebrate collections--will allow researchers at the Roosevelt Collection to share information with other institutions such as the American Museum of Natural History, the New York State Museum and the Chicago Field Museum.

Visitation

The Roosevelt Wildlife Collection attracts close to 1,000 visitors every year. School groups are given special attention. The collection unfortunately is not arranged or staffed for general public display but it benefits ESF students, faculty and visitors every year, enhancing existing knowledge, providing an opportunity to observe and study various animals without going into the field, and contributing to public awareness of the importance of research to the conservation of our diminishing wildlife.

If you wish to donate specimens, the Roosevelt Wildlife Collection accepts taxidermy mounts from private collections. You could help build the collection of our more unusual wildlife.



ESF staff members are available to interpret the collection for visitors.

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2. Roosevelt Wild Life Annals.

The *Bulletin* is intended to include papers of general and popular interest on the various phases of forest wild life, and the *Annals* those of a more technical nature or having a less widespread interest.

The editions of these publications are limited and do not permit of general free distribution. Exchanges are invited. The subscription price of the *Bulletin* is \$4.00 per volume of four numbers, or \$1.00 per single number. The price of the *Annals* is \$5.00 per volume of four numbers, or \$1.25 per single number. All communications concerning publications should be addressed to

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STREAM IN THE PETERBORO SWAMP REGION.

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| 4. Tree Sparrow | 10. White-breasted Nuthatch |

A BIOLOGICAL RECONNAISSANCE OF THE PETERBORO SWAMP AND THE LABRADOR POND AREAS

BY CHAS. J. SPIKER

*Field Naturalist, Roosevelt Wild Life Forest Experiment Station,
Syracuse, New York*

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PART I. PETERBORO SWAMP

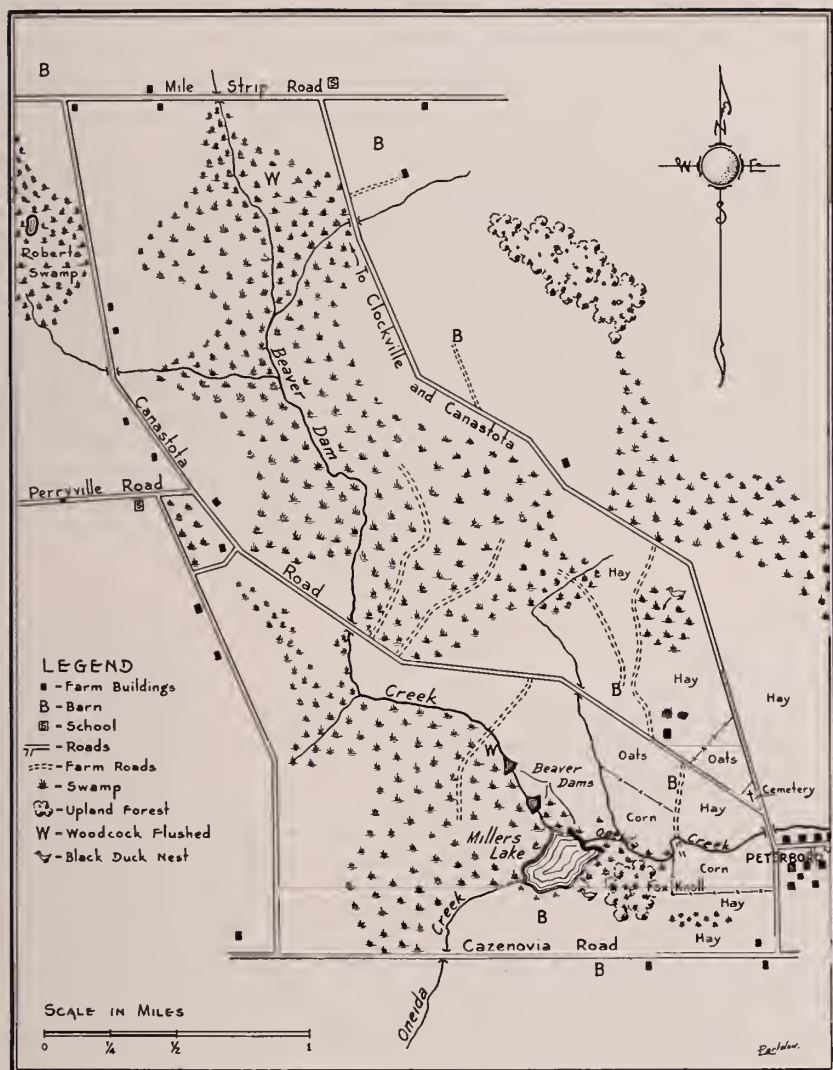
INTRODUCTION: GENERAL DESCRIPTION OF THE AREA

For some years past, the members of the Canastota Rod and Gun Club have been considering the feasibility of securing a suitable tract of land to be set aside as a permanent game refuge. After due consideration the area lying north of Peterboro, between that village and Canastota and known as Peterboro Swamp, appeared the most desirable for this purpose. Advice and cooperation were asked of the Roosevelt Wild Life Forest Experiment Station with the result that an observer was sent into the region for a period of six weeks during the summer of 1927. Subsequent visits to the tract at other seasons in the year have given us a reasonably complete view of the area during the whole year.

The purpose of setting aside such an area as is here described is two-fold: One, the creation of a permanent sanctuary for native wild life and game birds and mammals, with a view to stocking the surrounding country; the other, consideration of the region as suitable habitat for introduced species of game birds, such as the ring-necked and English pheasants, Hungarian partridge and wild turkey.

One of the most encouraging aspects of this work has been that of the attitude taken by residents of Peterboro community and Smithfield Township. Most farmers are inherently lovers of wild life; that should follow their occupation; and outside of a deeply seated prejudice against raptorial birds as a class, they are very friendly toward our wild life and are anxious to cooperate in its protection. Many little acts and expressions of courtesy from the inhabitants of the area demonstrated their hearty approval of the project.

I wish to express to Dr. Charles E. Johnson, Director of the Roosevelt Wild Life Forest Experiment Station, under whose direction the work was carried on, my heartiest appreciation for his sincere cooperation and his valuable suggestions as to manner of conducting the survey. Thanks are also due Mr. Roger Barott of Canastota for helpful ideas and suggestions regarding the interest which local hunters have in the work. I desire also to express my appreciation of the many kindnesses and courtesies shown me by the Hon. Gerrit S. Miller, Mr. and Mrs. Thomas D. Hoyt, and Mr. Frank D. Hoyt, all of Peterboro, and to Mr. P. E. Clock of Canastota.



Map 1. Sketch map of Peterboro Swamp showing cultivated areas as they were in the summer of 1927.



Fig. 1. Looking northeast across Peterboro Swamp, showing mixture of swamp and cultivated areas. Village of Peterboro in distance to the right. July 5, 1927.



Fig. 2. Portion of Peterboro-Canastota road near Roberts' Swamp, looking north. A few rods west are fine growths of pitcher plant and showy lady's slipper. July 6, 1927.

The area known as Peterboro Swamp, with its surrounding hills, is located near the center of Madison County, which in its turn occupies almost the geographical center of the state of New York. The swamp itself comprises roughly 1400 acres. It is three miles in length, and from one-half to three-quarters of a mile in breadth (Fig. 1). Its southeastern border approaches within half a mile the village of Peterboro, from which it derives its name, while its southern end is a trifle south of the southern boundary of the village, and west of it. At the north border of the swamp proper is an east and west road crossing it, known locally as the Mile Strip, but swampy land extends for several miles north of this and the vegetation is the same as that within the Peterboro area proper. By rail the territory may be reached by the New York Central and Hudson River R.R. at Canastota, nine miles northwest of Peterboro; by the New York, Ontario and Western R.R. at Morrisville Station and at Munnsville east of Peterboro, and by the Lehigh Valley at Blakeslee (Post Office, Perryville), five miles west. The macadam highway from Canastota to Morrisville passes through the village of Peterboro, and the territory is connected with Perryville by hard road, via Alene.

In approaching the area from Canastota, there is a rise of 900 feet in altitude in the course of the nine miles. The average altitude at the edge of the swamp is 1300 feet, while that of the hills surrounding it is 1600 to 1800 feet. The highest point of land in Madison County, 1862 feet, overlooks the swamp from the southwest (Fig. 1). The whole area gives evidence of glacial work in past ages, for, besides the large swamps, there are many small basins among the hills, which have become ponds or sink-holes (Fig. 7). There are also places where the land breaks suddenly, making a drop of several feet, which would indicate a little waterfall in times past, since there are usually vestiges of an old creek channel for some distance below it. Drainage in this particular area is to the south-east, through Oneida Creek, which later turns northward and empties eventually into Oneida Lake. The water-shed between Peterboro and Canastota occurs about a mile south of Alene, or about four miles north of Peterboro. Beaver Dam Creek flows southward through Peterboro Swamp, uniting, west of Peterboro village, with Oneida Creek which comes from the south up to this point, then continues in a general eastward direction for some miles before turning northward, to enter finally into the eastern end of Oneida Lake.

The hills which overlook the swamp from all sides, while several

hundred feet high, are not bluffy or abrupt (Fig. 12). There is a gradual ascent, the slopes rocky and washed in many places, with gullies that deepen following rains. The tops of the hills are bare and the soil is poor, so that little is done by way of agriculture.

The bottom of the swamp is composed of a gray marl overlain in the wettest portions by about a foot of black muck. In the drier and more open portions of the swamp the soil is porous and light and might be termed a poor grade of peat. The muck supports a luxuriant and varied mass of vegetation and furnishes very uncertain footing for anyone who would penetrate the depths of the swamp (Fig. 23). While there is in many places a dense mat of semi-floating vegetation to support the walker, at every step the water oozes up about one's shoes, and a stick or staff thrust suddenly down for balance will often penetrate without resistance for a distance of three or more feet. Fallen trees, long ago rotten and moss-grown, lie in every direction and are piled one upon the other. The gray marl has much of the quality of quicksand, and there are cases on local record of cattle and horses which have become so mired that extrication was not possible.

Swarms of mosquitoes infest the boggy portions of the swamp in summer and are stirred up from the weeds and grass as one passes through. Deer flies also abound in the drier timber and both these insects are hindrances to the student of nature as he toils his way through the swamp on a summer day. In many places the swamp is hardly more accessible in winter, for with a thick covering of snow the ground does not freeze, and walking accordingly is as difficult at this season as in summer.

The soil over much of the area is of a rocky, limestone composition, becoming very soft and slippery with rain, but drying rapidly in fair weather. This is a dairying community, so that hay and corn are the staple crops. In many places cultivation extends to the edge of the swamp itself (Fig. 6). The limestone soil appears excellent for the production of alfalfa and clover hays, while corn may be raised for silage purposes. Due to the difference in altitude, there is a difference of about two weeks in the length of season here and at Canastota nine miles north. Some oats is raised for dry feed, and in recent years more or less attention has been given to garden crops, such as peas, beans, etc. The uncultivated open areas afford good pasture to cattle.

Beaver Dam Creek extends from northwest to southeast, with a gentle fall its entire length. It is a clear stream despite the fact that it flows through muck land; but that is probably explained by the



Fig. 3. Road through Morrisville Swamp south of Peterboro. Splendid ruffed grouse habitat on either side of the road. January 2, 1928.



Fig. 4. A portion of the above road, showing how its beauty is spoiled at intervals by the promiscuous dumping of refuse. January 2, 1928.



Fig. 5. Buildings on Gerrit S. Miller farm. Purple finch, bronzed grackle, phoebe, robin and song sparrow nested near the house. Barn swallows and starlings in the barns. Bobolinks and meadowlarks inhabited the clover in the foreground. June 14, 1927.



Fig. 6. Edge of Peterboro Swamp showing fringe of cedars. Taller timber beyond, beech and maple. June 10, 1927.

fact that much of the muck is composed of vegetable matter. There are occasional spots in the swamp where the stream seems to become lost altogether, disappearing into the ground, and at such points one may cross the swamp without apparently encountering any stream. Occasionally, throughout the swamp, there are higher portions in the form of dry knolls, the largest being Fox Knoll (shown on the map). The plant life here is the same as that of corresponding altitude along the borders of the swamp.

Oneida Creek, flowing in from the southwest, has a more gravelly, rocky bed and a swifter current (Fig. 33). A few rods before its union with Beaver Dam Creek, it expands into a small pond known as Miller's Lake (Fig. 25). Some sixty years ago, Mr. Gerrit Smith, then owner of the land, attempted to drain this area, but with little success. In the process the outlet to the lake was deepened and widened, and today, Oneida Creek from the point where it emerges from the lake to its junction with Beaver Dam Creek several rods below, is ten to twelve feet in width and three or four feet deep (Fig. 1). At the time of the drainage project, Mr. Smith walled the stream with rock, on both sides, from a point a quarter of a mile west of the village to an old mill which has since been razed, but which stood at the eastern edge of Peterboro village. Brown, brook and rainbow trouts have been planted in this stream in late years and have prospered so that fishing is said to be "good."

Some of the hills surrounding the swamp are steep, and inaccessible by team or tractor, and their soil, too, has become washed and worn, so that outside of their possible usefulness as pasture, they can be of little agricultural value. It appears to me, however, that such areas would be admirably suited to reforestation, with the purpose of cover for game kept in mind. White pine and hemlock, among other species, should prosper in such places; and, if given a start, doubtless also many smaller plants and shrubs.

Any reforestation which might be done would probably in future years not only prove useful to various game projects that might appear practicable, but would provide a certain return in timber.

THE PRESENT STATUS OF MAMMALS ON THE PETERBORO AREA

Game Mammals. SNOWSHOE RABBIT OR VARYING HARE (*Lepus americanus virginianus*). The snowshoe rabbit cannot now be considered common on the tract. I found the species in the open marsh in the habitat of the marsh hawk, Traill's flycatcher, and other birds of such preferences. The animals were seldom sighted, as they kept very close to the cover of the swamp grasses and sedges. Occasionally a snowshoe rabbit would be seen in the private road running through this part of the swamp, but instead of scurrying down the road for some distance, as is a habit of the cottontail rabbit, it would immediately leap into the cover, where only the disturbance of the vegetation would mark the course of its passage. It seems here to be a much more timorous animal than the cottontail.

On making inquiry of residents of the neighborhood, I found that many persons were concerned about the diminution in numbers of the snowshoe rabbit and refrained from hunting it. I was told, however, that various dogs running at large in the vicinity hunted the swamps all winter long, a fact which may have something to do with the relative scarcity here of these rabbits. Foxes are fairly common over the area and no doubt these, too, take their toll. But it is to be recognized that the area of proper habitat for the snowshoe rabbit here is too limited to make possible any considerable numbers.

The best cover for the snowshoe rabbits is found in the area already mentioned and in the dry portions of the timber where there is a considerable growth of fern and of "ground hemlock" (Fig. 16). There is an ample food supply over the whole area, as in summer these animals feed on the various clovers under cultivation and on the tender blades of various grasses. They feed in winter largely on the foliage of conifers and on the bark of other trees and shrubs. There is an abundance of arbor vitae and hemlock, both of which branch very near the ground and offer a source of food.

No indications of disease among the rabbits were heard of or noted. The only dead rabbit found lay in the highway and had most probably been killed by an automobile.

The breeding period for these animals is in the spring, the young being born in May, with three to six in a litter. It is believed by some local residents that there are two litters in a season. The attitude of the residents towards the species is favorable and no complaints were heard as to any damage done to small trees, shrubbery or other vegetation.

The chief natural enemies of this species in the area in question are the red fox and the great horned owl. Snowy owls are present in considerable numbers during certain winters and might perhaps be included in the catalogue of its natural enemies. Weasels and mink are occasional over the area.

The snowshoe rabbit may here be increased in numbers, I believe, by posting and rigid protection of the area. I believe that the natural enemies above mentioned are not numerous enough seriously to affect its numbers; and besides this food, there are sufficient numbers of small rodents and insectivores to satisfy any predatory mammals or birds found on the tract. It has been reported from a reliable source that 75 pairs of snowshoe rabbits were placed in Peterboro and Morrisville swamps during the winter of 1929-30 by the local chapter of the Isaac Walton League.

COTTONTAIL RABBIT (*Sylvilagus floridanus mearnsi*). The cottontail is, of course, much more common here than the varying hare, but it cannot be said to be abundant. It has not been hunted in this area for the past two seasons, because of having been found to be tubercular, so I was informed. Whether disease keeps its numbers down or whether the animal cannot increase because of too many natural enemies such as foxes and owls must remain a matter of pure conjecture until much more is actually known about it. There appears no reason why with a period of protection from hunting, the species should not soon show a satisfactory increase.

NORTHERN WHITE-TAILED DEER (*Odocoileus americanus borealis*). Deer are reported in the general vicinity of Peterboro, every so often. Five individuals were reported during the month of June, 1927, about four miles north of Peterboro and just south of Clockville. Deer are reported more frequently from the neighborhood of Morrisville Station, so it is quite possible that strays may wander occasionally through the particular area here under discussion. The cover in the swamp is thick enough and the area here is large enough probably to harbor for short periods, at least, a few individuals that might stray in, if left undisturbed.

During the fall of 1930, deer have been seen at intervals in Peterboro Swamp proper, in the neighborhood of the Harry Campbell residence and on the G. S. Miller farm. They do not appear to be shy and are seen in the fields or when crossing the road, by persons driving along the highway.

RED FOX (*Vulpes fulva*). I saw no foxes during the time I was in this territory, but the winter season would be a better time for

finding evidence of their presence. I was told, however, that they are reasonably common at certain seasons, coming in from surrounding territory. There is excellent cover, but the territory is scarcely rocky enough to offer natural dens. There are not, evidently, enough either of foxes or other "vermin," so-called, to keep mice under conspicuous control, for these are abundant in the tract. Occasionally foxes are hunted and killed in winter by local residents.

MINK (*Putorius vison vison*). Mink are few in this territory. They are trapped regularly by boys as well as men of the vicinity. I was told of a pair of mink that have been inhabiting an old, little used barn, standing a mile from any other buildings, just above the swamp on the east side. These mink, or other individuals, were said to have been there for several years. My informant said the animals would frequently come out and look about them with a questioning air as he and his companions, who were working the land adjoining, sat in the barn resting and eating their noonday lunch.

WEASEL (*Putorius noveboracensis noveboracensis*). Weasels are found throughout the area, although their numbers are, of course, difficult to estimate. While the weasels are popularly considered among the most relentless enemies of wild life, keen of scent and intensely bloodthirsty, it is necessary to keep in mind that these animals have definite limitations as to power and capacity and consequently prey mainly upon smaller animals, chiefly mice and small birds. Mice, according to the weight of evidence, is their most abundant prey, and the easiest to secure. Where this food resource is plentiful, no great fear need be entertained for larger game such as rabbits, grouse, pheasants, etc.

RACCOON (*Procyon lotor lotor*). The tracks of this animal were occasionally seen in the mud along the streams and in old logging roads. The people of the neighborhood find some winter sport in 'coon hunting. There were a number of good 'coon dogs in the neighborhood, but I wondered if, as these dogs ranged the swamps, they gave all their attention to raccoons alone.

SKUNK (*Mephitis putida*). Skunks are found throughout the tract and are doubtless the most common of the local carnivores. Aside from their value as fur, skunks are now widely recognized as having a distinct economic importance as insect destroyers. Mr. B. H. Warren, in discussing the army worm in Pennsylvania, names the skunk as one of the most voracious feeders upon this pest in that state, and regards the animal as a great asset to the farmer. On the other hand, the presence of skunks in a bee-lot may prove a direct

menace to this industry. Skunks are, furthermore, of some aid in keeping in check the mouse populations, which, except, doubtless, for their various natural checks, might increase beyond computation. Skunks are trapped quite systematically in the Peterboro swamp region, yet seem able to hold their own so far as numbers are concerned.

MUSKRAT (*Ondatra zibethica*). Muskrats are present in limited numbers, both in Miller's Lake and in the sink holes, wherever cat-tails and other marsh vegetables occur. Mr. Hoyt told me that during the winter of 1926-1927 the boys from the village had caught twelve muskrats in the sink hole directly back of his house (Fig. 8).

BEAVER (*Castor canadensis*). Credit for the discovery of beaver on this area belongs to Mr. Joseph Houck of Peterboro, who was trout fishing along Oneida and Beaver Dam creeks during the summer of 1927, when he noticed some freshly cut alder stems which appeared to him to be the work of beaver. He came to me and together we went to the place, which was on Beaver Dam Creek, just a few rods above its union with Oneida Creek. More work had been done since Mr. Houck's last visit. Being at that time unfamiliar with beaver work, I collected a few of the larger sticks and kept them to await the arrival of Dr. Gerrit S. Miller, Jr., curator of the Bureau of Mammalogy of the Smithsonian Institution, who was expected on a visit to his former home here. Upon his arrival he examined the sticks and then visited the scene of cutting with me, whereupon he declared that without doubt the cutting had been done by beaver.

It has been a great many years since beaver have been in this territory; nearly fifty years according to older residents. Legend has it that they were at one time abundant along these streams. Beaver are known to exist along some of the small streams emptying into Oneida Lake from the north, and there is little doubt that some wandering individuals from these colonies found their way up Oneida Creek and established themselves in the Peterboro swamp.

Later in the autumn a substantial dam was constructed by these beaver directly below the junction of the two streams mentioned previously, which backed the water up for a considerable distance through the swamp.

This dam was built of mud and alder branches in typical beaver fashion, the mud being plastered on top of a foundation of sticks. This dam was about three rods in length and endured until some time in 1930, as in October of that year when I visited the place, the

portion of the dam spanning the channel of the creek had been destroyed. Instead of repairing this break the beavers went upstream a few rods and constructed a second dam across the junction of the two creeks (Fig. 41). At this point a dense tangle of nightshade covers a large area on both sides of the creek, hanging over on each side so as to conceal the water (Fig. 42). The dam placed here is much simpler in construction, the tangle of nightshade forming the chief foundation, its thick, woody stalks furnishing the necessary support. Mud is plastered on these stalks to a height of eighteen inches or two feet, and is of such consistency that it will support the weight of a person walking the entire length of the dam. Because of its location, the dam is not straight, but roughly S-shaped, and is about eight or ten rods in length (Fig. 43). The animals are not disturbed and appear to be well settled in this location.

The pond formed by this dam materially increases the size of Miller's Lake (Fig. 44) and obliterates the banks and channel of Oneida Creek between the old outline of this pond and Beaver Dam Creek (Fig. 46).

The huge lodge constructed by the beaver is situated about half-way between the dam itself and the original Miller's Lake. It is about four rods east of Oneida Creek proper (Fig. 49). Of recent construction, it is at the present time (December, 1930) intact and in good shape. Approached from the east it appears dome-shaped, but there is a gradual slope from its apex down into the water on the west side (Fig. 50).

The Small Rodents. While squirrels are few in practically all of the area, there are many ground-dwelling rodents distributed generally. Among the most common are chipmunk (*Tamias striatus lysteri*), meadow mouse (*Microtus pennsylvanicus*), Gapper mouse (*Eutamias gapperi gapperi*), white-footed or deer-footed mouse (*Peromyscus maniculatus gracilis* and *P. leucopus noveboracensis*), and the two jumping mice (*Napaeozapus insignis* and *Zapus hudsonius*).

Insectivores. Both short-tailed and long-tailed shrews (*Blarina brevicauda* and *Sorex personatus*) were present; and there were indications of the hairy-tailed mole (*Parascalops brevirostris*), although none were taken.

Some of these little animals were abundant, the chipmunk especially so, and should therefore constitute a supply of food for the predatory birds and mammals on the tract, sufficient to prevent any serious depredations on small game.



Fig. 7. View from cupola of barn showing one of several sink holes on the borders of the swamp. Note the muskrat house. June 17, 1927.



Fig. 8. Near view of above sink hole. Bitterns, spotted sandpipers and killdeer visited this place daily; red-winged blackbirds nested here, and barn swallows gathered insects over the water. June 24, 1927.



Fig. 9. Timber inhabited by black duck and green heron. These trees stand in water much of the year and in summer there is a quantity of duckweed here. June 24, 1927.



Fig. 10. The above in winter, showing how small an area is needed by black duck provided it is dense enough. December 26, 1927.

BIRD LIFE IN GENERAL

There is a rich variety of bird life in the territory due to the variety of environmental or habitat areas. While the deeper and more remote parts of the swamp would not be found accessible to the general public, there is no type of habitat which the student might not penetrate in part, and the opportunities offered for bird study are many. During the whole time that I was on this area, including the six weeks' summer residence and subsequent visits at other seasons of the year, I listed one hundred fourteen species of birds. This, of course, would not comprise a full year's list, which should approximate two hundred species or more. Representatives of practically every family of our inland birds, with the exception of gulls and terns, may be found on the tract.

The enemies of birds in the swamp are in no sense numerous. I found the nests of two marsh hawks, and the presence of a third female indicated another nest, although it was not discovered. The pellets picked up about one nest after the young had departed showed that the principal food consisted of small rodents. It is believed by residents of the community that in winter these hawks subsist largely on ring-necked pheasants, and I found the hands of many raised against them for that reason. However, during two winters when I made repeated visits to the swamp, no marsh hawks were seen, and it is my opinion that the casual observer might easily have confused the species with the goshawk which visits the place in winter. Only one pair of red-tailed hawks was found, and they had a nest on a wooded hill overlooking the swamp from the east. An occasional broad-winged hawk was seen, and a Cooper's hawk was seen on two occasions. Owls were apparently not very common, and on very few nights did I hear the calls either of the great horned owl or of the barred owl. Crows, however, were common, and likewise bronzed grackles, both of which are in places considered more or less of a menace to certain forms of bird life. A check is, however, kept on these last two, by the gun of the farmer, their invasion of poultry yards and cornfields giving him ample opportunity for shooting.

Of the smaller undesirable species, the English sparrow and the starling were most common. The starling, of course, must be regarded as something relatively new, and time will be needed to ascertain its effect on the bird life of the region. These species would prove a menace only around farm buildings where they might crowd native species out of nesting sites. One pair of house wrens

was noted at Peterboro village, and one pair was found nesting near the northern end of the swamp; but since it is largely where they are unduly encouraged that they prove undesirable, whatever depredations these few might commit would have a negligible effect on the other small bird life of the area.

As to predatory mammals, they are few. The red fox is said to be reasonably common throughout the territory, although I saw none. This animal might at times prove damaging both to the ruffed grouse and the ring-necked pheasant. Red squirrels are present, but I could not call them numerous. Chipmunks abound. There are many skunks, which are a pest at times. They are not difficult to trap, however, and should be easily kept under control. I visited a beelot which had been molested, and on that day three skunks had been caught there in traps. Mink are present over most of the region, and there are a few raccoons. I saw no species of snake here harmful to small birds or mammals.

The various bird habitats presented by the area are as follows: Forest Habitat, Upland Thickets, Swampy Woods, Open Marshes, Open Fields, and Farmyards.

Birds of the Forest Habitat. By Forest Habitat is meant the dry timber which borders the swamp in many places (Fig. 39). The swamp is also quite heavily forested, but there are recognizable differences in the avifauna of the two habitats. The forest habitat consists of larger trees such as beech, sugar maple, elm, slippery elm, basswood, black birch, hemlock and black cherry. The forest floor here is carpeted with American yew or "ground hemlock," and a thick growth of vegetation is found in most places, the most common plant being the pallid jewelweed (*Impatiens pallida*). Some partridge berry (*Mitchella repens*) is found in hemlock territory, and there are many flowering plants, such as violets, buttercups, agrimony, wild ginger, hepatica, Solomon's seal, jack-in-the-pulpit, trillium, false miterwort, wild leek, and many others that such a habitat supports. Under the green vegetation is a mat of dead leaves the decay and disintegration of which enriches the soil.

Birds of the Forest Trees. COOPER'S HAWK (*Accipiter cooperi*).

This hawk is not common on the area, but is found occasionally. Upon one occasion when I saw it I was able to approach until I was almost directly underneath the bird, which was perched in a tree about twenty-five feet above me. It seemed nervous and kept uttering a series of "chucking" cries similar to those of the broad-winged hawk. This was in a deep and heavily shaded section of the swamp and it is possible that it had a nest near by, although a search failed

to reveal it. This species, as well as its smaller counterpart, the sharp-shinned hawk (*A. velox*), is possessed of considerable audacity, which, with its swiftness of flight, makes it a formidable foe to small game and other birds. It is, as has so often been pointed out by authorities on birds, to these two swift-flying hawks that the term "chicken-hawk" should properly be applied, for with the utmost fearlessness they will sometimes venture close to farm buildings and carry off a young chicken almost from under the feet of the owner. But their numbers have become so much reduced in the settled districts that their effect on small game can hardly be a serious matter at the present time.

GOSHAWK (*Astur atricapillus atricapillus*). This large, powerful hawk is found in the Peterboro area during the winter months, and a number of individuals have been taken during each of the past several winters. This species may also come into the catalogue of true "chicken-hawks" and share the epithet with the Cooper's and the sharp-shinned. Like these it is very daring in its attacks on poultry yards and will carry off fowls of larger size. Because of its size and strength this hawk must be considered a source of danger to small game in the winter months if an invasion of considerable numbers occurs. Shooting it can always be undertaken.

In general appearance the goshawk might at a distance be mistaken for the marsh hawk, but the absence of the white rump should be noted, as well as the presence of the slaty blue back. It is my opinion that winter depredations in this area credited to the marsh hawk should be laid at the door of the goshawk, for I found no evidence of marsh hawks on this tract in winter.

BROAD-WINGED HAWK (*Buteo platypterus platypterus*). The broad-winged hawk should be classed with the beneficial hawks; it cannot be looked upon as an enemy of game. Its food consists of small rodents, frogs, reptiles and insects. It is of an unsuspicious nature and when flushed will fly but a short distance before alighting again. In appearance it resembles somewhat the red-tail rather than the marsh hawk, or the Cooper's hawk. Its broad, rounded wings, and short tail with the two heavy black bands make up its distinguishing field marks. It is a noisy bird in the forest, giving its oft-repeated querulous scream, a note which is often given also by the blue jay, but whether in imitation, as is commonly supposed, or as a natural call of the jay may be somewhat doubtful.

BARRED OWL (*Strix varia varia*). One night when I walked from Canastota to Peterboro, I heard three of these owls at different

points along the road, but all within the area described in this paper. The barred owl is one of our most interesting owls. Its eyes and facial disk and absence of "horns" give it a strongly human appearance. In my experience, the barred owl has been much more approachable in daytime than the great horned owl, and upon being frightened from its roost, often will fly but a short distance before alighting again. Over half the food of this species consists of mice and other small rodents, but it also eats crayfish and frogs. I see no reason to think that this owl might develop into a menace to small game animals of any sort on this tract.

SCREECH OWL (*Otus asio asio*). These little owls are not so much in evidence until fall and winter when their quavering calls may be heard night after night. Because of their small size, they can hardly be classed among the enemies of game, although they at times prey on small birds (Fig. 18).

GREAT HORNED OWL (*Bubo virginianus*). The status of this species of owl is somewhat in the balance. It is a powerful bird, which requires it to be held in check in territory where small game is to be encouraged in more or less isolated and restricted areas such as the one here concerned. Contrary to the common popular notion this owl feeds on many other things besides small game animals, and in so far as it destroys mice and rats and other small rodents which tend to multiply rapidly, it must be recognized as a beneficial species in many communities. In the case of Peterboro Swamp and surrounding territory, so far as my own observations extended, the species did not appear to be common.

SNOWY OWL (*Nyctea nyctea*). Here, as elsewhere in this latitude, the appearance of the snowy owl in winter is not regular. The bird is said locally to be common through some winters and rare at other times, appearing in irregular flights or waves. During the winter of 1926-1927, Mr. P. E. Clock, a taxidermist of Canastota, collected a dozen or more of these birds or had them brought to him for mounting. It is popularly thought that the snowy owl is responsible for a depletion of the ring-necked pheasants during the winter months, provided it is present in sufficient numbers. The same idea, probably, is held with regard to the ruffed grouse. But real evidence or reliable information on either point is lacking, and arbitrary condemnation of the species is therefore unwarranted.

HAIRY WOODPECKER (*Dryobates villosus*) and DOWNY WOODPECKER (*D. pubescens medianus*). These birds are so similar in appearance and habits that they may be considered together. They

may usually be distinguished in the field by their difference in size, the former being usually much the larger. But even this is not an unfailing distinction, as a large male downy may sometimes be as large as a small female hairy. The true difference, however, so far as marking is concerned, may be found in the outer tail feathers, those of the hairy being pure white, while those of the downy are barred or specked with black. The observer must, however, be quite near either bird in order to make out this distinction. A common popular name heard for these species is "sapsucker," but this is erroneous, for their fare consists largely of insects and the eggs of tree-boring insects. They are among our most valuable birds to agriculture and deserve all the protection we can give them. The two species are about equally common over most of the surveyed area. In winter they frequently leave the woods and visit the vicinity of farm buildings. At that season they can be easily attracted by placing beef suet in accessible places.

YELLOW-BELLIED SAPSUCKER (*Sphyrapicus varius varius*). I found two nesting pairs of this species and saw others at intervals throughout the wooded territory, so they may be said to be reasonably common. Both nests were on the edge of the timber overlooking the open marsh land, although the birds when away from the nest kept well within the timber. Most of the hemlocks found bore evidence of their popularity with this species, some having hundreds of perforations in the bark. Sapsucker work on trees is easily identified. The birds bore regular holes spaced about an inch apart and extending for a foot or more up and down the trunk and sometimes entirely around the trunk of the tree. In flight, the sapsucker greatly resembles the hairy woodpecker, it being of about the same size and there being the same intermingling of black and white, but at rest it is possible to see the blood-red throat and nape which would at once identify it. The birds are noisy, and it was the cry of the young that drew me to the discovery of the nests.

RUBY-THROATED HUMMINGBIRD (*Archilochus colubris*). It may appear a little unusual to place the hummingbird in the forest habitat, but it can appear nowhere else in this report, as that is where the individuals noted were seen. On June 11, 1927, I saw four individuals, the most seen in any one day. On several occasions I found the hummingbird in the vicinity of a sapsucker's nest, and in one instance I watched one following a sapsucker about from tree to tree, always perching near it when it lit. I have wondered if it was not following the sapsucker in order to share in the sap which this species feeds upon.

WOOD PEWEE (*Myiochanes virens*). Found everywhere, from village and dooryard to the thickest timber. The species is more frequently seen, however, in the forest habitat. It is one of the few birds that call through the middle part of the warm summer day. Entirely insectivorous in its food habits, it is a valuable bird in the forest environment.

BLUE JAY (*Cyanocitta cristata cristata*). There were a few blue jays to be found at intervals through the timber, but not in numbers sufficient to disturb the peace and quiet for smaller birds. Not more than six individuals were seen on any one day, and the birds were heard more often than seen.

The blue jay has an evil reputation for ravaging the homes of smaller birds, but at the same time, "it takes a thief to catch a thief", and he heralds loudly enough for all to hear, the approach of a hawk or the discovery of an owl.

CROW (*Corvus brachyrhynchos brachyrhynchos*). Common. I heard no complaints regarding the crow as a harrier of poultry. Whether it is to be classed as an enemy of the ring-necked pheasant and the ruffed grouse of the area, at least during the nesting season is a question no one seems prepared to answer. Crows were nesting on the tract in June and showed a preference for hemlock as nesting sites, the nests being placed near the tops of the trees.

SCARLET TANAGER (*Piranga erythromelas*). This is the most strikingly colored bird of the forest habitat, one of the least often seen because of its partiality for the tree tops, and one of the most often heard in early morning and late in the evening. The song has a robin-like tempo, but is extremely nasal and much less musical. The brilliant scarlet body set off by coal-black wings and tail makes up, however, for any lack in musical performance. The tanager has a call note given in times of excitement or distress which Mr. W. M. Rosen, former president of the Iowa Ornithologists' Union has likened to the word "Pittsburg," the first letter given very forcibly, thus throwing a marked accent on the first syllable, with a rather hollow nasal sound for the second.

RED-EYED VIREO (*Vireosylva olivacea*). The song of the red-eyed vireo may be heard continually from dawn till dusk. This bird is another of the few which keep on singing through the hot part of the day. During the periods of feeding and song, it is a bird of the upper branches, but its nest is often placed within a few feet of the ground. I have often found the red-eyed vireo one of the victims of the cowbird, but that parasitic species is fortunately not very common in the area here concerned. Regarding the song of



Fig. 11. The "Lone Pine" in the southeast corner of the swamp, a conspicuous landmark of the region. December 26, 1927. This tree fell during the autumn of 1930.



Fig. 12. Portion of tillable land south and east of the swamp showing its rolling character. December 26, 1927.



Fig. 13. Near view of wood inhabited by black ducks. Also habitat of water-thrush and green heron. The water in the middle-ground extends back into the wood. June 24, 1927.



Fig. 14. Hay meadow in daisy time. Savannah sparrows abound here, while bobolinks and meadowlarks are found also, with barn swallows skimming back and forth. June 24, 1927.

the red-eye, I recall that in reading the accounts of it given by several authors, I found thirty-eight different adjectives describing the song. The bird is nicknamed by some the "preacher-bird" because of its discursive, leisurely way of giving its tripled notes, there being a marked pause between each group.

BLACK-THROATED GREEN WARBLER (*Dendroica virens*). This species is rather difficult to observe in its habitat, since it shows a preference for the tree-tops in its search for food, and in its choice it is partial to coniferous trees. Its constant song is, however, striking and forces itself upon the attention. I can best describe it by the syllables "zee-zee-zee-ZEE-zee zee," the fourth syllable heavily accented. It is rather a drowsy, rasping song, at times the accented note being followed by but one note, and sometimes preceded by four notes instead of the usual three. The bird is olive-green in general coloration, with two white wing-bars. A yellow line over the eye and a black throat extending down onto the breast constitute its more prominent markings. It is very common over all the forest habitat, and I have found several singing from the same clump of trees. It is also as common in the swampy areas as in the dry woods.

WHITE-BREASTED NUTHATCH (*Sitta carolinensis carolinensis*). The nuthatch, while not common in this region, is generally distributed. It is one of the most inquisitive-looking of birds; it descends the tree head downward, peering into every little nook and cranny, at the same time keeping a watchful eye on the intruder. Always setting a good example itself, it repeatedly utters its nasal gospel of "work—work—work—work—work." The slaty blue back of this bird contrasted with the pure white breast and belly form a striking picture against the trunk of any tree.

RED-BREASTED NUTHATCH (*Sitta canadensis*). This species may be found at rare intervals during spring and fall migrations, doubtless as a stray from the Adirondacks where it is common. I found an individual in the timber near Miller's Lake on October 16, 1930. It is slightly smaller than *S. carolinensis*, but follows the same habits in searching for food. Its chestnut breast and the dark line over the eye are marks of distinction. Its notes are less nasal than those of the above species, and uttered less often, although where two or more individuals are together they set up a rapid chattering which may last for some minutes.

Birds of the Shrubbery and Forest Floor. I do not feel it necessary to draw a line of distinction between the Shrubbery Habitat

and the Forest Floor Habitat, for many of the birds which feed in the shrubbery nest on the ground, so that the two habits are closely related. Most of the shrubbery consists of the young growth of either beech or maple, and good cover is provided by ferns, jewelweed and yew or ground hemlock (Fig. 39). In such a tangle of cover as this vegetation affords, it is difficult to see, and often even to flush a small bird that has taken refuge in it.

BLACK-THROATED BLUE WARBLER (*Dendroica caerulescens caerulescens*). Although this warbler spends much time feeding and singing among the upper branches of the trees, it is always to be found where there is a dense growth of underbrush, into which it descends at intervals to mount again up to the tree-tops, singing its dry, lisping song as it goes. It is one of the common songs of the summer woods, and it enables one easily to locate the songster. The bird is a slate-blue above, darker than that of the nuthatch, while the throat and breast are inky black. The white wing patch, present in both sexes, will serve to identify the female, which is olive-greenish in color and resembles the male very little in other respects. These little warblers are very active, seemingly never quiet for a moment.

OVEN-BIRD (*Sciurus aurocapillus*). The oven-bird is pretty evenly distributed numerically between the Forest Habitat and the Swamp Woods Habitat. It is a bird of the ground and not often seen unless one be in the vicinity of its nest, when it resorts to the broken-wing ruse, common to ground-nesting birds, to lead the intruder away. Its loud song, which many have likened to a repetition of the word "teacher," given some six or eight times on a rapidly ascending scale, with the terminal series of phrases given in a ringingly violent manner, is one of the common songs in the woods during the first half of the summer. I have also heard it given on moonlight nights, near midnight, when an individual, possibly awakened and mistaking the moonlight for the breaking of day, prematurely "saluted the dawn." Smaller than the robin, olive-brownish above, white below with a spotted breast, and with a pale orange crown which is seldom seen in the field, the bird harmonizes so well with its surroundings that if it does not move it may remain unseen even though in plain view and but a few yards distant from the observer. It is largely good fortune that leads one to the discovery of the nest of the oven-bird, a ground nest, arched over by protecting leaves and foliage, giving an oven-like effect; hence the name of the species.

MOURNING WARBLER (*Oporornis philadelphia*). This vociferous little warbler required repeated search before I finally located it. Its



Fig. 15. Grouse habitat in a dry portion of the swamp. Yew, covered heavily with snow, forms good winter cover. January 2, 1928.



Fig. 16. A condition similar to the above and in another portion of the swamp. Such situations exist on little knolls arising at intervals through the swamp. January 2, 1928.



Fig. 17. Winter habitat of chickadees and white-breasted nuthatches. These birds feed diligently through these small groves of mixed trees. December 27, 1927.



Fig. 18. The screech owl near the break in the tree limb is well protected by his similarity to his surroundings. He did not escape the eyes of chickadees, however, and I was attracted to his hiding place by their alarm notes. December 27, 1927.

song is rather gurgling and rollicking, having some of the qualities both of the oven-bird and the water-thrush. When near the ground it keeps well to the underbrush and the ferns. The coloration of the species is somewhat remarkable: grayish above, with yellow belly; and a dark gray throat and breast, darkening into a complete black band on the lower breast, the whole resembling a mourning veil. That, however, is the only mournful characteristic of this warbler, as in actions and song it is exceedingly sprightly and musical.

CANADA WARBLER (*Wilsonia canadensis*). One of the less common warblers of this area and an intermittent singer, this bird is not often seen. Its distinguishing field mark is a black, lace-like necklace across a rich yellow breast. It seems to frequent both swampy woods and dry, but is more common in the latter, and is always found down in the depths of the underbrush.

REDSTART (*Setophaga ruticilla*). One of the least common warblers in the area generally, but there were usually a half dozen to be found in the neighborhood of Fox Knoll. The male is mostly black on head and body, not unlike a diminutive towhee, and this color seems to be intensified by the brilliant red bars through wings and tail. Unusual as it is among warblers, the female, although of a different color, is as strikingly marked as the male. She is olive-greenish instead of black, while the wing and tail bars are yellow. The bright, flashy colors of the redstart make the bird a conspicuous object as it flits from twig to twig, pausing at intervals to utter its few delicate notes, strongly suggestive of those of the yellow warbler, but weaker. The redstart is preyed upon to some extent by the cowbird, and it is not unusual to see one or more of the hungry young of that interloper following a pair of redstarts through the undergrowth.

CHICKADEE (*Penthestes atricapillus*). This little busybody, which is associated in our minds with winter and snowy weather, is common. By the time this survey was begun (June), it had given up its plaintive "pee-wee" song, except for an occasional utterance at intervals, as if loath to relinquish it, and the note most often heard was the characteristic "chickadee-dee-dee-dee," from which it derives its name. The chickadee is one of the most cheery and friendly of our birds and one of the first that the beginning student learns to know. It is about the size of a wren, gray above, lighter gray below, and with a conspicuous black cap and throat. It is easily attracted about the home by means of feeding stands, with suet and other food, in winter.

WOOD THRUSH (*Hylocichla mustelina*). The selection of a favorite bird is of course, a matter of personal choice, and to me the wood thrush is the most beautiful songster of the forest. Its bell-like notes at evening constitute one of the most restful sounds in my experience. The wood thrush is second to the Wilson's thrush, or veery, in numbers in the Peterboro neighborhood, although but a few are found in any one patch of timber. While a bird of the middle branches, the wood thrush occasionally comes to the ground to nest, and very often finds much of its food on the ground. The wood thrush is one of the few birds whose alarm notes have a distinctive musical quality instead of being simply harsh chirps or call notes. Facing the bird, the amateur might mistake it for a young robin, as the breast is heavily splotched with black, but the back is a rich russet-brown instead of the gray of the robin.

Birds of the Swampy Woods. By swampy woods is meant the main body of the swamp. It is too wet in most places for jewelweed and yew, or ground hemlock, to form the ground cover, but there are rank growths of ferns and brakes which offer good concealment to the small forms of wild life found there (Fig. 23). Violets of various species abound, and there are in the wettest portions thick growths of marsh marigold (*Caltha palustris*). Around the borders of the swamp are thriving stands of arbor vitae (*Thuja occidentalis*), and in the swamp itself much beech and maple, with a scattering of oak and elm. No roads penetrate such places and no wood is cut in them even in winter, for snow usually comes early enough and in sufficient quantities to protect the swamp surface from freezing, so it is not possible to enter with horses and sledges. Fallen, rotting trees lie in every direction, and moss-covered humps in many cases sink under the weight of a man. Pools of water occupy the cavities left by uprooted trees and it is necessary for the exploring individual here to look carefully and part the ferns and brakes ahead of him or he is likely to drop into these pits unawares. Wading boots are a necessity in crossing the swamp at most places. The greatest hindrance to one's pleasure in investigating such places is the presence of clouds of mosquitoes and great numbers of a form of fly known locally as buck fly or deer fly.

The small portion designated on the map as "Roberts' Swamp" is different from the rest of the swampy area in some of its plant life. Here I found the only tamaracks or larches (*Larix laricina*). It was here also that I saw the only pitcher plant (*Sarracenia purpurea*) and pogonia (*Pogonia ophioglossoides*) (Fig. 35). A

small pond, almost round, and not more than three rods in diameter, occupies the center of a small open space, around which these plants grow. The showy lady's slipper (*Cypripedium hirsutum*), too, one of the most interesting of flowers, grows here, although this plant is equally common throughout the northern part of Peterboro Swamp (Fig. 28). It might be well to suggest here that in case this land should be set aside as a wild life refuge, protection should be extended to include this wild flower also. Digging up of any of these for transplanting purposes should be forbidden, for although they appear common enough in this limited area, and may be quite inaccessible so far as the general public is concerned individuals can nevertheless enter, and it would not take long to make serious inroads on their numbers and perhaps threaten the existence of these flowers. They are essentially a part of the beauty and charm of such surroundings.

The smaller forms of orchis or lady's slipper are quite generally distributed over the northern end of the swamp, although they appear several weeks earlier than the showy lady's slipper (Fig. 27). To my mind there are no midsummer flowers which add so much to the aesthetic enjoyment of the New York swamps as do the various representatives of this group.

As there is an abundance of insects of many kinds in these swamps, and as cover is ideal, bird life is plentiful. There occur here, among others, a number of forms which are more commonly associated with the dry forest, such as the downy and hairy woodpeckers, yellow-bellied sapsucker, wood pewee, red-eyed vireo, black-throated blue warbler, black-throated green warbler, chickadee, white-breasted nuthatch, wood thrush, and others. Game birds inhabiting the swamps are treated more fully under a separate heading. The birds listed are those found regularly in swampy habitat.

GREEN HERON (*Butorides virescens virescens*). The green heron was common in the neighborhood of Miller's Lake and was also found in the other black duck territory north of the Hoyt residence (Fig. 9). I have always thought the title "green" a misnomer, for the bird is more of a slate-blue, with a reddish brown neck topped by a tuft of greenish black feathers. Its food consists of frogs, small fish, and other small water animals. The bird is mainly a twilight feeder, being most active in early morning and in the evening, remaining rather quiet during most of the day. It can scarcely be considered as having any distinct economic importance.

KINGFISHER (*Ceryle alcyon*). One of the most common birds along Oneida Creek and at Miller's Lake is the kingfisher. The

abruptness with which his "watchman's rattle" breaks the stillness of a summer morning is well known. There is an abundance of food here for the kingfisher, as the streams abound in minnows and other small fish. It might be a factor to take into consideration in connection with the introduction of young trout, but otherwise it can hardly be considered an undesirable species. The bird is strikingly colored, being a conspicuous gray-blue, white beneath, with a dark band across the breast, and, in the case of the female, chestnut sides. The head is slightly crested and the bill conspicuously large. During the first week in July, a pair of kingfishers brought their young to a little swamp north of the Hoyt dwelling. During the entire day the parents were making trips between this point and Oneida Creek, half a mile distant.

WHITE-THROATED SPARROW (*Zonotrichia albicollis*). This sparrow is more often heard than seen, and its soft, gentle flutings are among the pleasing bird songs to be heard in the swamp. The bird is not common enough in the swamp for its calls to become monotonous, as is the case in its more frequently chosen breeding grounds, and it is usually found deep in the swamp. Never boisterous, rollicking or loud, the song seems to slip out easily without apparent effort, of the same tone throughout, with only a slight variation up or down. There is an air of contentment about the song of the white-throat which makes it distinctive among the forest bird songs. Belonging to a family of birds which are uniformly dull colored, the amateur might have difficulty in identifying the species unless he catch a view of the pure white throat and the streaked crown. When alarmed or agitated over the presence of intruders, the bird utters a sharp, metallic "chink," but shows little fear.

NORTHERN WATER-THRUSH (*Sciurus noveboracensis noveboracensis*). Among the most haunting songs of the swamp is the ringing, broken whistle of the water-thrush. To pursue him and get a glimpse of this elusive creature requires a pair of wading boots, a familiarity with quagmires and the floor of the swamp, and much patience. But, with perseverance you will finally come upon him, a little brown bird, just a little larger than a sparrow, with streaked breast, a line over the eye, legs unusually long for a member of the warbler family, and tail constantly teetering. On two occasions during the time spent in the swamp I saw the water-thrush exhibit the broken wing ruse to lure me away from her nest. Her actions in such cases seem to be the product of real concern and distress. The bird lives down in the bog among ferns and rotting logs where its colors harmonize so well with its surroundings that



Fig. 19. With the whiteness of Carrara marble, the new-fallen snow gives a cathedral-like aspect which is one of the winter wonders of central New York. December 26, 1927.



Fig. 20. Here the woodchuck sleeps the winter months away; the tree sparrows gather from time to time, and chickadees and nuthatches are heard along the edge of the forest. December 27, 1927.



Fig. 21. Open marsh along the highway a mile northwest of Peterboro. Habitat of marsh hawk, swamp sparrow, Traill's flycatcher, red-winged blackbird and chestnut-sided warbler. June 17, 1927.



Fig. 22. Nestling marsh hawks about three days old. Note the one in the foreground, on his back in characteristic attitude of defense. When disturbed, young marsh hawks throw themselves on their backs and thrust their sharp claws out viciously toward the intruder. June 17, 1927.

were it not for its loud calls and its continual bobbing, it would rarely be noticed.

WINTER WREN (*Nannus hiemalis hiemalis*). I shall never forget the day on which I stole through this swamp in a futile attempt to see the producer of a long-continued warble of unexcelled vivacity and sweetness, which seemed each time it was given as though it would never end. The first attempt was unsuccessful, but two days later, in another part of the swamp, when he sought me instead of I him, he revealed himself to my sight. I was resting on a log, when about a rod in front of me appeared a winter wren, eyeing me as if with the greatest curiosity. Apparently satisfied with his observations, he hopped upon an old tree-root and there poured forth the pleasing little ditty the source of which I had so vainly tried to locate a couple of days before. This tiny brown bird, his stubby tail held at right angles to his back, is one of the most "chic" appearing birds in the swamp. I had been familiar with the species in the Middle West during migration periods, but the song was new to me, so I was delighted at this opportunity of hearing him in his summer surroundings. The species may be found in all parts of the swamp.

BROWN CREEPER (*Certhia familiaris americana*). Familiar with this little tree climber as a winter or migratory visitor in the Middle West, I was agreeably surprised to find it in the Peterboro Swamp. The creeper inhabits the deepest and darkest part of the swamp with the winter wren and the water-thrush. I never see the creeper jerking himself spirally up a tree but there comes to my mind part of the words of an old negro spiritual, "I'se inchin' along, jes' inchin' along." A characteristic habit of this species in tree climbing is almost invariably to start at the foot of a tree and travel half or two-thirds of the way to the top, then to fly to the foot of another tree and repeat the performance. Through the nesting season these birds were to be found only in the swamp itself, but after the young had left the nest, they wandered out into the beech and maple woods of the drier part.

WILSON'S THRUSH (*Hylocichla fuscescens fuscescens*). There is a haunting, elusive air of mystery in the song of Wilson's thrush, although there is hardly that ethereal exaltation of spirit which is produced by the liquid, bell-like notes of the wood thrush. I would describe the song of Wilson's thrush as a low "whieu-wieu-wieu" given on a descending scale, and often with a tuneless trill ending the last note. The sound is mysteriously hollow, as if the singer had his head in a lead pipe, and is never given above a medium pitch,

so it lacks altogether the liquid quality of the song of the wood thrush or the rollicking freedom of that of the robin. On June 28, 1928, I flushed a sitting bird from her nest, which was little more than a depression of the leaves among the growth of ferns. I tried a number of times later to find the nest again, but could not even find the landmarks by which I had determined to be guided. This is the commonest of the thrushes in the swamp, and is distributed generally over the area.

HERMIT THRUSH (*Hylocichla guttata pallasi*). This species must appear here tentatively as none were found on the area, excellent though the environment would appear to be. Mr. Gerrit S. Miller, Jr., of Washington, D. C., told me that in the days of his collecting over this region, a number of years ago, the hermit thrush was not uncommon at the northern end of the swamp. Here it was found in the boggy portion, in the habitat of the woodcock, water-thrush and Canada warbler.

Birds of the Farm Buildings and Shade Trees. The examples of this habitat with which I became most familiar were the buildings designated on the map as "Hoyt home" and owned by G. S. Miller, and the village of Peterboro (Fig. 5). These birds are an index to the species which one would expect to find about any set of farm buildings in the territory concerned. There was a great number and variety of species found in this environment, both as summer residents and as transients. The discussion, however, will deal in detail with only the most common forms.

The buildings of any size on the Miller farm were the dwelling, dairy barn, horse barn, cattle shed (which was built as an ell of the dairy barn) and a machine shed. The trees in the dooryard were Norway spruce (*Picea Abies*), maple, elm, white ash, red cedar and lilac. The mornings were made musical by the songs of the birds in these trees, and I was often able to list, from their songs alone, a dozen or fifteen species before I left my room in the morning. There were two cats at the barn, one of which was rearing a litter of three kittens, and although I often saw her bring in field mice, and an occasional chipmunk, I never saw her with a bird. A robin's nest containing three young and located on a rail fence within a few rods of the barn, from which the young took flight in the due course of time, had apparently not suffered any molestation from this cat.

The village of Peterboro itself consists of half a dozen stores, with fifteen or twenty dwellings facing an expansive village green bordered by large trees. Oneida Creek flows through the north half

of the village, and this with the standing trees formed a suitable habitat for birds of the open trees and lawns.

FLICKER (*Colaptes auratus luteus*). The flicker is the most common woodpecker over the entire area and one or more could usually be seen at any time along roadsides and in meadows, devouring ants. The white rump, the yellow flashes at every wing-beat, and the loud, ringing oft-repeated call of "flicker-flicker-flicker," readily identify this bird. Its food habits make it one of the most valuable bird inhabitants of any farming community. It feeds largely on ants, but consumes as well tree borers and other insects of more or less injurious nature.

CHIMNEY SWIFT (*Chaetura pelagica*). A pair of swifts nested in the chimney of the boiler-room in the Miller dairy barn, and every evening they could be seen and their twitterings heard as they circled overhead among the barn swallows. There were not more than half a dozen pairs of chimney swifts at Peterboro village. The local climatic conditions are probably the indirect cause of the relative scarcity of these birds here, for chilly snaps may come at any time during the summer, when a fire in the heater is started, with consequent disruption of affairs in the chimney.

KINGBIRD (*Tyrannus tyrannus*). Kingbirds are one of the most common of roadside and orchard birds. They are extremely pugnacious, and spend much time speeding the flight of a passing crow or a marsh hawk. There was probably a pair for each square mile of open country in the Peterboro area. One pair nested in the old orchard near the Miller buildings, and there was a great twittering and jangling whenever a crow would appear. In the general coloration of this bird the dark brownish black of the back forms a strong contrast with the extreme white of the under parts. On but very few occasions in my life have I seen the ruby gem that adorns the crown of this bird, a mark that is very difficult to see in the field. The kingbird feeds wholly on insects and is placed among the predominantly beneficial birds.

PHŒBE (*Sayornis phæbe*). I located ten pairs of phœbes on the area under survey, one of which nested under a cement bridge, the others in old buildings. The males did not sing much after the first of June, as compared with most other birds, for since they nest early, family cares are soon upon them. A few bars early in the morning before his family was fully aroused to the pangs of hunger was all the singing time the average of these males was allowed. The phœbe is about the size of a sparrow, is uniformly olive-brownish

above a soiled white below, with an almost black crown. A characteristic which identifies this bird in the field is its habit of twitching its tail directly after alighting on a twig or fence. Like the other members of the flycatcher family, the phoebe is considered beneficial to agricultural areas, as its food consists entirely of insects.

STARLING (*Sturnus vulgaris*). This European species, introduced into this country in 1890, has in the intervening forty years spread as far west as Nashville, Tenn., and Chicago, Illinois, in great numbers, and individuals have been taken during the spring of 1929 at Oxford and New Hampton, Iowa. It is abundant in the Peterboro area. I have seen it stated that the starling is very apt to become a serious competitor with the bluebird in the matter of nesting sites, but the few observations I have been able to make on both species in the Peterboro region fail to confirm such a fear. I found three starling nests about the Hoyt farm, two of which were in holes in trees, at least thirty feet from the ground, and the third was in a knot hole in a silo, fifteen feet above the ground. I have never found the bluebird nesting more than eight feet above ground. The starling does not belong here, however, and although its economic status may be still in some doubt, yet it is a foreigner, and as in the case of the English sparrow, its success in this country will probably tend to cause some form of disturbance in the bird life. The male is a glossy black bird, polka-dotted with fine yellowish white spots. The wings are long and narrow, while the tail is short and broad; features easily discernible when the bird is in flight. Immature birds appear a light uniform gray in color at a distance, and have a more brownish appearance when near at hand. During the winter the starling is highly gregarious and immense flocks may be seen flying in compact formation. The bird has gained some reputation as a mimic by its ability to imitate the notes of other birds.

BALTIMORE ORIOLE (*Icterus galbula*.) Next to the scarlet tanager, this is the most brilliantly colored bird to be seen in central New York. A pair nested in a large elm tree along the highway just north of Peterboro and their musical notes as well as their chattering scoldings were among the early morning sounds to be heard in that locality. The species is not uncommon, for several pairs were found over the area here under discussion. The brilliant orange of the body is almost like a flame as it darts about amid the foliage. Its pensile nest is hung from the tapering tip of an elm branch, and such a location usually insures a successful rearing of the family, at least to the time they are able to take to their wings.



Fig. 23. In the heart of the swamp. Habitat of winter wren, brown creeper, black-throated blue warbler, mourning warbler and oven-bird. June 10, 1927.



Fig. 24. Hundreds of fallen trees such as this are found throughout the forested area and enhance the value of the swamp as habitat for forest bird life. January 2, 1928.



Fig. 25. Pond known as Miller's Lake. Habitat of black duck, water-thrush, green heron, kingfisher and various wood warblers. June 10, 1927.



Fig. 26. Close-up of Miller's Lake showing spatter-dock. This pond is fished for trout during the season, and in winter furnishes the ice for all the farms about Peterboro. June 10, 1927.

GOLDFINCH (*Astragalinus tristis tristis*). The "wild canary" of children, this sociable little bird is to be found in flocks throughout the first half of the summer. Its bright yellow body, black wings, tail, and crown, together with its sweet, plaintive lisplings, make it an attractive creature on any ramble about the countryside. It nests much later than most birds, usually not building until the middle of July or the first of August. The female does not share the golden hues of the male, but is olive-greenish in color. The species is recognized as useful to the agriculturist, because its food consists almost entirely of the seeds of noxious weeds. The nest is built of the finest grasses, lined often with milkweed down or some other soft fibre, and is never placed very far from the ground.

CHIPPING SPARROW (*Spizella passerina passerina*). The chipping sparrow's chief field mark is the rich reddish brown crown, bordered by a black stripe. The nest, too, is readily identified by its lining of horsehair, which has gained for the species the common name of "hair-bird," in many localities. The song is monotonous, a dry, unattractive "chippy-chippy-chippy" repeated over and over. The bird will sit out in the sun during the warmest days of summer and give this call repeatedly from dawn till dark. I discovered in the Peterboro district one very unusual nesting site for this species. In exploring an old hay barn, I was brushing past the hay overhanging the middle lane, when a bird flew out just even with my head and perched on one of the heavy beams above me. Investigation disclosed a nest built in a depression of the hay and containing two eggs. I also found a nest in the Virginia creeper vine which clung to a silo; but the nest is commonly built in a low bush or tree, and often at the tip end of a hemlock branch. This little sparrow, too, is often made a victim of the cowbird's rascality, and not infrequently it may be seen feeding the offspring of this parasite and showing the utmost concern for its welfare.

SONG SPARROW (*Melospiza melodia melodia*). This is perhaps the most common bird in the area, as many as forty or fifty individuals having been seen on a single day in the field. It is found generally distributed over the whole territory, low ground and high, but always where it is more or less brushy. The song is given early and late, perhaps the most musical of any of the songs given by the group known usually as sparrows. This member of the group is about the size of the English sparrow, brownish above streaked with black, lighter below with wedge-shaped streaks of blackish which run together into a large splotch of black on the centre of the breast. The nest is built on the ground or in low bushes, of grass and root-

lets, with a lining of the same materials. I found one nest containing six eggs, which appeared to crowd it to its capacity.

BARN SWALLOW (*Hirundo erythrogaster*). This is the most common species about farm buildings. Scarcely any set of farm buildings had less than four pairs, and the relatively numerous buildings on the Hoyt farm gave habitation to at least fifteen pairs. When it is considered that each pair produces five young, of which the majority reach maturity, it will be seen that the species increases rapidly in favorable situations. The nest is placed on a beam or joist overhead, sometimes on a two-by-four at the highest point of the hay-mow roof. Thus it is out of reach of terrestrial enemies, and being under a roof is spared the molestations of aerial enemies. The young are ready to fly when they first leave the nest, and apparently do not depend much on trial flights, although they may perch about the inside of the building for several days before venturing outside. Insects constitute the food of the barn swallow, and these graceful forked-tailed birds spend much time swooping over the meadows gathering food from the tops of the grasses or the surface of ponds.

CEDAR WAXWING (*Bombycilla cedrorum*). Brilliant though the orioles and the tanagers may be, there is, to my mind, no more beautiful bird to be found afield than the cedar waxwing. Its soft, rich brown is a rest to the eye. At the same time there seems to be a mysterious something about the cedar bird, something ghostlike or eerie. There is no song, only a gentle, whispered lisp, and it may be this characteristic silence that lends to the bird that elusiveness possessed by no other family of our birds. The pointed crest adds an air of aristocracy to the cedar waxwing, and no bird is more meticulous as to its appearance. One of the remarkable things about waxwings in general is their simultaneous flight. A flock of fifty to a hundred waxwings will be sitting in the top of a tree, when all at once the entire flock will arise as one bird, either to fly away, or simply to circle above the tree and alight again. It is seemingly impossible to note which individual bird of the group was the first to leave its perch or which the last; all move at the same instant. As the name indicates, the birds are partial to cedar trees, feeding, especially in winter, on the berries. In summer they show a partiality for the various species of wild cherry, and will gather in considerable numbers in such trees. Like the goldfinch, the waxwing delays its nesting till the middle or latter part of the summer. The nest is placed in coniferous or in orchard trees, usually at no great elevation.

HOUSE WREN (*Troglodytes aëdon aëdon*). Only two pairs of house wrens were noted here, one being in the village of Peterboro and the other just north of Roberts' Swamp, near the northern end of the tract and not far from the old village of Alene. The house wren in this territory can hardly be considered an enemy to other small birds, because of its insignificant numbers, and if it is let alone and not urged unduly to take up its abode about farm yards or buildings, it is likely indefinitely to remain inoffensive. It is only when a species is introduced from the outside or when a native bird is encouraged to breed beyond its natural limit, that it is likely to become a nuisance to its feathered neighbors. The absurdity of making one's premises especially attractive to blue jays would doubtless at once be recognized, and yet people will, out of puerile sentimentality, put up inviting nesting boxes for the smaller but equally pugnacious house wren until within a few years, they have nothing but this energetic little scrapper about them. I have lived in communities where the only bird on a city lot, besides the robin and the English sparrow, was the house wren. No vireos, no warblers, no grosbeaks; no opportunity for the more desirable species to gain a foothold. Perhaps this may seem to some irrelevant, here, but I rejoiced so much in the great variety of birds found about the farmsteads in this territory, that I feel a warning may well be sounded early lest anyone conceive the notion that it would be desirable to have more house wrens about his dooryard.

ROBIN (*Planesticus migratorius migratorius*). It is hardly necessary to mention the presence of this all-American bird; the first harbinger of spring for many people, and the delight of every child. Every old barn on the tract at Peterboro has its robin's nest, and every dooryard knew the melody of its rollicking song.

BLUEBIRD (*Sialia sialis sialis*). The bluebird was common over the entire tract, and was found nesting in old orchard trees and in fence-posts by the roadside. On an afternoon when I had the Girl Scout Troop of Peterboro in the field on a bird hike, I wished to show them a bluebird's nest which was in the top of a large fence-post and which could be seen in its entirety from above. When we arrived at the point, the female was brooding, and as the girls were very quiet and careful she remained on the nest while each individual member of the group of fourteen in turn looked in. Even after we had passed by she did not come out to see what all the fuss was about.

Besides the species listed in some detail, the following additional birds of this habitat should be mentioned here to complete the list for the district: mourning dove, sparrow hawk, black-billed cuckoo,

Directly back of the Hoyt house was a small pond or sink hole warbling vireo, yellow-throated vireo and yellow warbler. These birds were seen only occasionally, or a single pair was found inhabiting a restricted area on the tract.

Birds of Open Marshes and Lowland Thickets. The largest portion of open marsh was located between the Canastota road and Beaver Dam Creek, and comprised between twenty and thirty acres as an estimate (Fig. 21). The whole area was covered with swamp grasses and sedges, and in many places with an almost impenetrable thicket of spiraea. It was in this place that the two marsh hawk nests mentioned earlier in this work were found. This swamp had an abundance of bird life, of considerable variety. There were few places where the ground was actually wet during summer, although in spring and fall the entire area was soggy. The ground here is of a peat-like composition, being light and spongy, differing thus from the black muck of the timbered swamp. Best cover for the ring-necked pheasant was available, and I once flushed the woodcock here.

Directly back of the Hoyt house was a small pond or sink hole surrounded by cat-tails and other marsh vegetation (Figs. 7 and 8), while three-quarters of a mile north of the cemetery shown on the map was a similar pond, but grown with wild iris and cat-tails, so that no part of it was open. In the former or open marsh were a few scrubby trees, mostly pussy willow and quaking aspen. Most of the shrubbery consisted of the before-mentioned spiraea, and a species of honeysuckle, while a considerable growth of dogwood (*Cornus alternifolia*) occurs along Beaver Dam Creek.

Although dry under foot, the area was very difficult to walk through because of the densely matted spiraea. One continually tripped over this vegetation, and it was hard at times to keep from falling. There were a few snowshoe rabbits in this habitat, and low as the location was, there were numerous woodchucks.

Bird life here was of the kind usually to be expected in any such habitat. To ground dwelling forms the dense grasses and shrubbery offered a good protection against enemies from above.

AMERICAN BITTERN (*Botaurus lentiginosus*). The bittern is a common inhabitant of the open marshes of this territory. The bird was often seen about the little pond near the Hoyt home, and on a number of occasions we could watch from the kitchen window or the back porch and observe it frog-catching. One occasion was particularly interesting, for the bittern seized a large, lively frog



Fig. 27. Small yellow lady's slipper (*Cypripedium pubescens*) found throughout Peterboro Swamp. June 9, 1927.



Fig. 28. Showy lady's slipper (*Cypripedium hirsutum*) found in Roberts' Swamp and at the north end of Peterboro Swamp. July 6, 1927.



Fig. 29. Brushy pasture east of Peterboro Swamp. Brush here is chiefly a species of wild crab apple. Habitat of field and vesper sparrows, brown thrasher, catbird and kingbird. July 13, 1927.



Fig. 30. Snow-covered hemlocks in southwest corner of Peterboro Swamp. This snow had been on the trees four days when the photograph was taken. December 26, 1927.

cross-wise and being apparently afraid to drop it and secure another hold on it, had a great deal of trouble turning it so it could be swallowed head first. A bittern among the dead cat-tails and iris is one of the best examples among birds of the concealing value of a certain color pattern, aided by body pose. With head and neck stretched upward and usually immovable it simulates its immediate surroundings so closely that it can sometimes be singled out only after the closest scrutiny, even when one is aware of its position. A common name for the bittern is "thunder pump." Early in the morning several of these birds may sometimes be heard giving this mysterious hollow, guttural sound, which may be likened to the gurgle that follows the sudden pulling of a good-sized stick out of soft mud. The call consists of three syllables, the last receiving the greatest emphasis "a-kga-OOMP, a-kga-OOMP."

SPOTTED SANDPIPER (*Actitis macularia*). The spotted sandpiper nests here in the meadows and pastures near the swamp and the ponds. By the middle of July the young were running about, and the alarm calls of the parent birds then were heard in a number of localities. It is interesting to see an adult teetering along the top rail of a fence, its cries of distress advertising only too clearly the proximity of its family.

KILLDEER (*Oxyechus vociferus vociferus*). The killdeer was common in the wet meadows bordering the swamp, repairing to the corn fields for nesting. These birds are inclined to be noisy and show great agitation during the nesting season whenever an intruder comes within their domain. Some young that were hatched in the immediate vicinity of the Hoyt farm buildings could often be seen running across the barnyard. I was told that in past years the killdeer had been much more plentiful in this district and had been long looked upon as a table delicacy. The reprehensible practice of shooting these harmless birds for the morsel of food they contain has, fortunately, come to an end.

TRAILL'S FLYCATCHER (*Empidonax trailli trailli*). This pleasing little flycatcher is an inhabitant of the brush-grown areas of the open marshes, showing a preference for the alder, willow, aspen and dogwood growths. One day, while walking along the road, I found an individual dead on the macadam, it having evidently been struck down by a passing car. It was the first one of this species I had ever found dead on a highway. The bird has a call note best described to my ear by the name "Fitzhugh" or "vitzyeou," the first syllable strongly accented. The note seems to burst from the throat of the bird with great force and energy. Like all the mem-

bers of its family, this flycatcher is valuable as a destroyer of insects. Traill's flycatcher is common in all the brushy marsh land, but by the middle of July has ceased singing and calling, so that it can be located with difficulty, more especially since it is naturally of a retiring disposition, and of drab coloration.

RED-WINGED BLACKBIRD (*Agelaius phœniceus phœniceus*). A beautiful picture is presented by the male of this species, with his glossy body set off by his scarlet and gold epaulets, as he perches on a small willow over the swamp, uttering his rather squeaky but not unmusical "quonk-er-eee." The pride of his harem, he sallies forth to hover over an intruder, uttering his vigorous and excited chirps of alarm, while his several ladies fair hop from branch to branch or shrub to shrub and urge him on. The nest is placed in a low tree or in the center of a hummock of sedge, and because of the advertising actions of the parent birds is not difficult to find. By the middle of July the birds leave the swamp to gather with others of their kind in great flocks, in the more extensive marshes. While in some communities the red-wing may become more or less of a pest in its depredations on small grains, this situation is usually a local one purely. In the case of this particular territory its diet consists largely of insects and weed seeds.

SWAMP SPARROW (*Melospiza georgiana*). The swamp sparrow is the most common representative of its family to be found in the marshes. His loud, monotonous call, very similar to that of the chipping sparrow but more forceful, may be heard at any time of the day. The swamp supported many pairs of these birds. They are difficult to see, unless one be in the vicinity of the nest, for they keep closely to the swamp grasses and sedges. The back has a soft, reddish brown coloration, with occasional black streaks, while the breast is grayish, the sides pale grayish brown and the belly white. These sparrows sing from the top of a clump of shrubbery, but upon being approached dive down into the grass and remain there, giving utterance to sharp chirps of alarm.

BLACK AND WHITE WARBLER (*Mniotilta varia*). This is fairly common on the tract, although not as common as the chestnut-sided warbler. It has much the same habits of feeding as those of the brown creeper, but ranges out among the smaller branches of the trees more than is habitual with that species. Its body is fairly evenly streaked with black and white; hence its name. It has a light, lisping song which is given repeatedly during the morning hours, but I have heard it at no other times of the day. The bird here seemed to have a preference for the large timber bordering



Fig. 31. Woodlot scene near Peterboro. January 2, 1928.



Fig 32. Wood cutting operations attract winter birds. Nuthatches, chickadees, hairy and downy woodpeckers and brown creepers come to glean after the wood cutters. January 2, 1928.



Fig. 33. Oneida Creek just above Peterboro village. The only spot where I found the redstart abundant. June 13, 1927.



Fig. 34. Oneida Creek near the spot where the above photograph was taken. Being spring fed, the stream rarely freezes in winter. January 2, 1928.

the open marsh, also spent much time in the small trees in the marsh itself.

CHESTNUT-SIDED WARBLER (*Dendroica pensylvanica*). This is a common warbler in the open marshes and its dainty little song is to be heard at intervals throughout the day. It is a beautiful little bird, and its rich chestnut-brown sides and golden pate make it unmistakable in the field. It is very restless, and always moving, flitting about from branch to branch in its tireless search for insects.

MARYLAND YELLOW-THROAT (*Geothlypis trichas trichas*). A common species of the open marshes. Its song, "witchery-witchery-witchery," can be heard throughout the day. These birds are at times very shy and at other times bold, this being a matter that varies, perhaps, with the individual. Always found near the ground and under low bushes, they are more or less elusive to any one who attempts to find them in the sedges. The black cheeks form the distinguishing field mark of the male and seem to intensify the sparkle of his eye as he peers out at one from his retreat. Besides the song above described, the yellow-throat has a harsh, wren-like chatter of alarm which is frequently heard.

CATBIRD (*Dumetella carolinensis*). The whining "meouw" which gives this bird its name may often be heard on a walk through the marshy brush. The song, which is strongly suggestive of that of the mockingbird or the brown thrasher, but less brilliant than either, is given during the early morning hours and again, often, just at dusk. The catbird prefers the low bushes where his nest of sticks is placed at elevations of three to seven feet. The birds are very pugnacious in defense of their young and at times in their fury will fly almost into the face of an intruder.

Other species of birds found in the open marsh were not sufficiently common to require more than mere mention, except the ring-necked pheasant which will receive fuller treatment under the chapter on Game Birds. Some others which appeared in the habitat or merely passed over it in their excursions in search of food were black-poll warbler, towhee, cliff swallow, rough-winged swallow, song sparrow and magnolia warbler. The marsh hawk, too, nested here, but I shall take up this species under the heading of Vermin Control.

Birds of the Open Meadows and Upland Thickets. These two kinds of habitat are treated together because the former was hay and pasture land while the thickets were largely given over to the pasturing of stock, and the variety of bird life found on the two tracts was not great enough to warrant separate treatment for each.

The chief hay crop is alfalfa, although there is also clover, timothy and some wild hay (Fig. 14). The meadows are rolling, although low in some places, and there is usually rain enough to insure a good hay crop. Some noxious weeds are found in the meadows, and after the middle of the summer there are plenty of crickets and grasshoppers. The upland thickets were composed largely of a species of thorn-apple (*Crataegus*), and such places were usually closely pastured by either cattle or sheep. There is thus plenty of food for various seed and insect-eating species. The uplands were cut by many dry gullies which contained water only following heavy rains.

The largest area of upland thicket was found east of the swamp and overlooking it from an altitude of five or six hundred feet (Fig. 29). The top of this hill was bare of trees and shrubs, and very stony. It was pastured by cattle during all of the time I was in the territory. This type of area covered in the neighborhood of forty to fifty acres.

While there was on the whole a variety of bird life found in these places, few of the species were common and others were represented merely by a few pairs each.

PRAIRIE HORNED LARK (*Otocoris alpestris praticola*). Not a common bird by any means, but a few were to be found on the top of the hill just mentioned. After the first of July, the birds were to be found very often in large potato patches wherever such occurred. The horned lark is very approachable and will not take flight until the intruder has come very near, sometimes as close as a rod or less. It is very much the color of the ground, on which it spends so much of its existence, being a yellowish brown above, streaked with black. The little turned up feathers over each eye, which give the suggestion of horns, are difficult to see in the field. The bird can raise and lower them at will. As it takes wing it utters a lisping note, given on a slightly ascending scale. During the spring and early summer these birds sing much at twilight, a tender little warble which, while not vigorous, has qualities which carry it quite some distance. It is given while the birds are on the ground. The horned lark also has a habit, similar to that of its European cousin, the skylark, of mounting upward through the air during its nuptial gyrations, singing as it goes until it is lost to sight. With the cessation of its song it plunges to earth, only to repeat the performance.

MEADOWLARK (*Sturnella magna magna*). The meadowlark is not an abundant species here, but one or two pairs inhabit every hayfield. Their sliding, characteristic song is one of the first sounds of each

new day in summer. So far as hay harvest is concerned, the young of the first brood have been raised and are well out of the way by the time hay is ready for cutting. One of the first harbingers of spring, coming with the robin and the bluebird, the meadowlark with its cheerful song is generally hailed with delight.

BOBOLINK (*Dolichonyx oryzivorus*). The bobolink "with his suit on backwards," as someone has said, is found in about the same numbers as the meadowlark. He is a conspicuous object with his white back and white marked wings, as he flutters across the meadows, his joyous, bubbling song seeming to buoy him up while his wings serve only the purpose of pushing him forward. Some of the finest poems of America have had the bobolink as their theme, notably the one by Oliver Wendell Holmes; and one of lesser fame but of much more recent date by Leroy T. Weeks, in which the song is described in a manner which fits the ebullience and joyous spirit of the bird.

"Inkle-ankle-onkle-inkle,
Tee-a, tee-a, tumble-tinkle,
So my tipsy bobolink'll
Jubel all the day.
Tee-a, tee-a, rumple-rinkle,
Until night with starry twinkle,
Stops his jingling lay."

The desired effect may be obtained by reading the opening lines with increasing rapidity, so that the short line makes the ending abrupt.

In the southern rice fields the bobolink has for many years been a pest during the winter months and has been heavily slaughtered as such, but in our climate it is classed as one of the most beneficial of our birds to agricultural interests because of its consumption of insects and weed seeds.

SAVANNAH SPARROW (*Passerculus sandwichensis savanna*). This is the most common bird of the open fields. Its dry, crackly call or song can be heard on the brightest, hottest days with never failing enthusiasm. The bird will often run through the grass ahead of one rather than take wing. I have sometimes followed an individual running in a wheel-track through a meadow. It would run along for several feet, stop, cock its head on one side and eye me as I approached; then run ahead again, finally turning off into the grass at the side rather than taking flight. There is always the possibility of confusing the song of this species with that of the grasshopper sparrow, and in pointing out the distinction I shall quote Saunders ('23, p. 273) whose remarks on this are very clear: "The song is weak

and insect-like in quality, a fact which will distinguish it from all sparrows save the Grasshopper Sparrow. While there is some variation, the syllables 'zip, zip, zip zee-e-e zee-e-e' will fit the majority of songs. The two 'zees' are on different pitches, but which one is higher is a matter of individual variation. The Grasshopper Sparrow . . . usually sings but a single 'zip' and one long 'zee-e-e.' Its voice is less musical and even more insect-like than that of the Savannah Sparrow."

Upon one occasion this summer I found an adult savannah sparrow with a foot caught in the windings of a barb on a wire fence. It had evidently been there for some time and had struggled so that its leg was broken in three places.

VESPER SPARROW (*Poæcetes gramineus gramineus*). The vesper sparrow is a transition species between the open meadow and the upland thicket, being found both in the meadows and at the lower altitudes of the upland thickets. It is one of the most musical sparrows and its song has much the same quality as that of the song sparrow, but to my ear it is sweeter and less nasal. The field mark of this species is the prominent showing of the two white outer tail feathers in flight. The vesper sparrow is invariably found near the ground, rarely mounting to a perch higher than a fence or small shrub.

FIELD SPARROW (*Spizella pusilla pusilla*). The field sparrow is a bird of the upland thickets purely, and I did not at any time find it in the low brushy pastures. Upon the large tract of thornapple above mentioned, from five to eight field sparrows could be heard in song on any bright day, at any hour. This species is another one of the small birds victimized by the cowbird. The song of the field sparrow is distinctive and easily recognizable, being a series of sliding whistles given slowly at first, then increasing in rapidity on a descending scale.

INDIGO BUNTING (*Passerina cyanea*). While not especially common over the particular tract under discussion, this species is more in evidence a few miles north of Peterboro and well up toward Wampsville. Its rollicking song is rather steely and metallic in its timbre as if in harmony with the iridescence of the bright blue coat of its owner. The female is duller colored, being of a grayish brown, with only the faintest suggestion of the blue coloring. It hardly appears possible that she can be the mate of such a brilliantly hued master. The nest is always placed in a low bush and near the ground. I have at various times found the cowbird's eggs in the nest of this species, too.

BROWN THRASHER (*Toxostoma rufum*). The brushy hillside referred to is well suited to the habitat preferences of this species, but the thrasher is not a common bird here. One pair spent the summer in this locality.

Other birds found over this area in small numbers include the red-tailed hawk, a pair of which had a nest at the edge of a bit of tall timber which overlooked the thorn apple thickets. On a similar hillside on the western side of the swamp were a few grasshopper sparrows. And on June 6, 1927, I here heard the long, plaintive "wheeeeeeeeee-eeouw" of a Bartramian sandpiper. I was told by Mr. G. S. Miller, Jr., that in times past this species could be found usually on the open uplands between Peterboro and Perryville.

THE PRESENT STATUS AND FUTURE POSSIBILITIES OF GAME BIRDS ON THE TRACT

Since one of the primary reasons for the present survey was the determination of the suitability of the swamp and its immediate environs as a place for the propagation of game birds, it may be well to consider these forms in a separate chapter. Game birds which have always been found here or which were once present include the black duck, wood duck, woodcock, bobwhite, ruffed grouse and ring-necked pheasant. Of these, the wood duck and the bobwhite are no longer found. There has been some question as to the adaptability of the place for Hungarian partridge and wild turkey.

BLACK DUCK (*Anas rubripes*). This is perhaps the most common duck locally throughout the East. I found the species in two localities near Peterboro. The first locality is a small, segregated stand of timber found about an eighth of a mile north of the farm buildings then occupied by the Hoyt family (Fig. 9). This timber consists of beech and maple and during most of the year stands in water from one to three feet deep (Fig. 13). Here are vestiges of the bed of an old stream which had its outlet through the main part of the swamp; but on ascending this depression for a few rods, one comes to a sudden halt before a bank over which the water must sometime have poured. Here one sees evidence of glacial work in the past. The water on this little pond is covered with duckweed, a favorite food of the black duck. There are in summer many frogs about the borders of the pond, and these would add substantially to the food supply. This patch of timber was actually occupied by a pair of black ducks, with nine young. The adult birds were very noisy, especially at night or in early evening, and would fly about

uttering cries not unlike those of the broad-winged hawk, when disturbed. This duck family was surprised a number of times when the parent birds had led the young out into the adjacent meadows. The young would scurry for the wood, using both legs and wings to urge them on, but they were not yet able to rise from the ground. About 4:30 one morning, Mr. Fred Vedder, who was employed on the Hoyt farm, saw the little family crossing the public highway from the south, as if they might have been paying a visit to Oneida Creek, which was half a mile south of their home locality.

The second family of black ducks was located at Miller's Lake, but this group was shier and more difficult to observe than the first (Fig. 25). The parent birds here were more noisy during the evening. Mr. Vedder once counted twelve young in this brood. There was no duckweed on the surface of this pond, but a luxuriant growth of cow lilies or spatter-dock (*Nymphaea advena*) covered the entire surface (Fig. 26). The vegetation of the swamp came to the edge of the pond, affording good cover at all times.

Regarding some of the characteristics of the black duck, it may be said that there appears to be no member of its family which is more successful in maintaining its existence. The species is not uncommon in the New York swamps, even during the time when all land is rigorously hunted over. Hunters say that the species is very difficult to deceive by wooden decoys, though quickly attracted by live decoys of their own kind. They feed much at night and the hunter must be up early in the morning if he expects a successful hunt. The black duck also responds readily to any protection offered it, so that its numbers may be expected to increase where suitable areas are set aside as sanctuaries.

In addition to any protection from hunting that might be accorded the species, it might be feasible to attract it to this area by supplying some of the various plants on which it feeds when they are available. I refer to *Carex*, *Cladium*, sedges, and the various species of smartweeds, duckweeds and lilies. Duckweed is said to transfer easily: the entire plant may be taken up from one pond and put into another where it will continue to spread. It might be possible to introduce wild rice and kindred plants about the small ponds and in some of the sluggish streams. Besides aquatic plants and animal food the black duck will also feed on weed seeds, hazelnuts, acorns, berries, roots of meadow grasses and earthworms.

WOOD DUCK (*Aix sponsa*). No wood ducks were observed during the time I was in the Peterboro region, but I learned from older residents that in years past it was the usual thing for several pairs to



Fig. 35. Boggy pond in Roberts' Swamp. A thick mat of dead vegetation supported the walker, but it was so fragile that the ground jarred for several yards about at every step. Here flourish the pitcher plant and showy lady's slipper. Birds here: water-thrush, black-throated green and black-throated blue warblers, oven-bird, wood pewee. July 6, 1927.



Fig. 36. Pitcher plant (*Sarracenia purpurea*) in Roberts' Swamp. This is the only place I found it growing, in the entire area. July 6, 1927.



Fig. 37. Scene along the road between Canastota and Peterboro. This is just below the entrance to Canastota Boy Scout Camp and at the top of the oxbow south of Clockville. August 28, 1927.



Fig. 38. Millpond above the sawmill at Alene, and just north of Peterboro Swamp. August 28, 1927.

spend the summer in the swamp. The physical features of this tract are said to have changed but very little in thirty or forty years, consequently the same environment is present which once harbored the species, also the same sources of food supply, so it appears to me that by rigid protection, there is no reason why the birds could not be induced again to inhabit the place. Being a bird of the woodlands, one important item in the food supply is beech mast, and while there are plenty of beech trees over the area, there has not been a plentiful supply of nuts for some years. This curtailment of food supply may have been one cause of the dearth of wood ducks in recent years.

Like the black duck, the wood duck responds readily to protective measures and if unmolested will increase if provided with sufficient area of suitable habitat. Many states in which these birds are found have placed them on the list of permanently protected game, hence their future appears brighter than that of many other species of wild fowl. It is generally conceded that there is no more beautifully marked duck in the world than the wood duck, so it is rather incomprehensible that any human might wish to rob our country of such a creature merely to satisfy a desire to shoot, or a craving for the insignificant quantity of meat. Since the bird has been protected in New England, Mr. Forbush tells us, it has increased in numbers considerably.

The wood duck feeds much like the black duck, on both vegetable and animal food, obtaining much of it in shallow water or on shore. It also feeds on insects, chestnuts, acorns, beechnuts, etc., which it finds in the forest.

Its nesting is different from that of other water fowl in that it chooses a cavity in a hollow tree at heights from three to forty feet. The young are pushed out soon after they are hatched, and taken to the water. Some observers claim to have seen the mother bird carry the young in her bill, when the nest was some distance from water, while others claim to have seen her transport them upon her back. Mr. Forbush thinks that the wood cutter is another agent in the decrease of the species, through his removing of dead timber and hollow trees, depriving the birds of their natural nesting sites.

WOODCOCK (*Philohela minor*). The woodcock is found in very limited numbers in both the heavily timbered swamp and the more open alder swamp. At the northern end of Peterboro Swamp I flushed an individual on June 8, 1927. It was in a very boggy portion of the swamp, the environment of the various species of lady's slipper and of arbor vitae. The bird had probably been

aroused from a mid-day nap, as it was just noon, and it rose heavily from the ground not more than a yard in front of me. It flew almost straight up into the air, and then dropped down into the swamp again, some distance away. The woodcock was, according to informants, formerly fairly common in the swamp, but, probably because of much shooting and the running of dogs over the area, they have been scarce in recent years. There is plenty of alder swamp available to the species here, and natural enemies are in no sense plentiful, so the matter of its increase is largely one of the protection from too much shooting.

AMERICAN QUAIL OR BOBWHITE (*Colinus virginianus*). An attempt was made in 1875 by the late Greene Smith of Peterboro, to introduce the bobwhite. Little can be gathered as to the events connected with that introduction, where the birds were obtained, or what actually became of them. This part of the state of New York is in the transition life zone, and Chapman ('22, p. 270) gives as part of the range of the species, "S. half of transition zones of e.N.A.," while Eaton, '09, p. 461, states, "The Bobwhite, or Quail, was formerly well distributed throughout New York State as far north as the counties of Jefferson, Oneida, Saratoga and Washington to an altitude of about 1000 feet" A flourishing weed crop is assured here from year to year, and there is much insect food, therefore it would seem to be matters of altitude and climate (rigorous winters, especially) rather than any lack of sustenance which prevent the bobwhite from getting a foothold here. The ring-necked pheasant, furthermore, has become quite abundant within recent years, and this bird might probably prove another obstacle to successful existence of the bobwhite within the same coverts.

There is perhaps no more valuable bird economically in an agricultural community than the bobwhite, and this has been recognized in sections of the country where the bird has been put on the list of permanently protected species. As a destroyer of weed seeds it has no equal and it feeds upon any and all kinds. Thousands of seeds will be eaten in one day by a single individual, and it has been computed by the U. S. Biological Survey that bobwhites in Virginia consume annually from the first of September to the thirtieth of April, five hundred and seventy-three tons of weed seeds.

RUFFED GROUSE (*Bonasa umbellus umbellus*). This was once a common game bird throughout the entire region, but it has been hunted so relentlessly that it is now better termed scarce. Four is the greatest number of individuals I have flushed in the Peterboro swamp on any one day; for the most part the birds were scattered



Fig. 39. Rank growth of yew and other brushy vegetation on Fox Knoll. Excellent ruffed grouse habitat. October 23, 1930.



Fig. 40. One of the several isolated barns on the tract. These segregated buildings harbor screech owls, skunks and mink in winter, and are summer nesting sites for robins, barn swallows and phœbes. October 23, 1930.



Fig. 41. Section of beaver dam across Oneida Creek. October 23, 1930.



Fig. 42. Thick mat of nightshade used by beavers as foundation for the above dam. October 23, 1930.

and occurred singly over much of the tract. I am told by people living in the vicinity that during the past few years little drumming has been heard, so there has evidently been a scarcity for some years in this swamp. I was told, however, that the species is still fairly common in Morrisville Swamp, three miles south of Peterboro (Fig. 3). This swamp is said to be more difficult, and even dangerous, to enter because of quagmires, hence it is not hunted so thoroughly as Peterboro Swamp.

As has been stated, summer cover for birds in both the swampy and the dry forest is excellent, but in the case of resident birds, winter cover must also be considered. The edges of the swamp are thickly set with arbor vitae, while the interior is cluttered with fallen trees, the tops of several of these often being massed together into a dense tangle. In the drier parts "ground hemlock" forms a good ground cover, which in winter offers convenient shelter by the manner in which it holds the fallen snow, forming little protected pockets under the laden boughs (Fig. 15). In most cases, the grouse which I flushed were in the swamp; the only individuals flushed outside the swamp were such as were taking dust baths in the earth piled at entrances to woodchuck burrows.

Among other vegetation occur many of the forms from which grouse commonly derive much of their food, and these are scattered well over the area, both in the timber, in the open parts and along the roadsides. Beech is plentiful in the larger timbered areas; there is much black alder and some black birch. In the more open spaces are found nannyberry (*Viburnum lentago*), a species of thorn apple (*Crataegus*), pussy willow (*Salix discolor*), black cherry (*Prunus serotina*), pin cherry (*Prunus pennsylvanica*), choke cherry (*P. virginiana*), service berry (*Amelanchier canadensis*), nightshade (*Solanum dulcamara*), mallow (*Malva moschata* and *M. rotundifolia*), and various species of *Rubus*, (blackberry, raspberry, and dewberry). False miterwort (*Tiarella cordifolia*) is plentiful in all the timbered areas, and wherever there is hemlock will be found a varying amount of partridge berry (*Mitchella repens*). Wintergreen (*Gaultheria procumbens*) is common in the swamp, growing over old moss-covered logs or around the base of old stumps.

The ruffed grouse cannot be considered an effective competitor with either the ring-necked pheasant or the Hungarian partridge, since these birds choose the open fields and thinly wooded areas. The ruffed grouse may appear in the open country at times in the autumn, but I have never found either of the other two birds in heavily wooded areas.

The greatest enemy of the ruffed grouse is without doubt the poacher, usually a foreigner who comes out for Sunday shooting. As to its natural enemies, perhaps the one most numerous is the red fox (*Vulpes fulva*), which is fairly common and is no doubt the cause of many a grouse tragedy during the winter months when the birds leave the trees and pass the night on the ground. Perhaps the presence of goshawks and snowy owls during the winter may account for a certain toll at that time. There are also some mink on the tract, as well as weasel. As to the hunter and his dog, that problem would be mitigated much by the posting of the tract, and other local measures, followed by rigid enforcement. I doubt if foxes would be likely to increase to any significant degree, for they are constantly kept in check by the farmers and others who trap and hunt; and the same is probably true for the snowy owl. Neither mink nor weasel are considered to be numerous so with the plentiful supply of food and thick cover, the birds should prosper if given half a chance by man himself.

Mr. E. H. Forbush, in his *Birds of Massachusetts* ('27, p. 35), gives the following list of vegetable food of the ruffed grouse, which I reproduce here in its entirety. It will be of value to anyone who might wish to know more specifically what the various food plants are, or what kinds to protect or cultivate in grouse habitats.

Nuts or Seeds: Hazelnuts, beechnuts, chestnuts, acorns. Seeds of tick trefoil, hornbeam, vetch, hemlock, pitch pine, maple, blackberry, lily, beggar's ticks, chickweed, sheep sorrel, sedges, violet, witch-hazel, beech drops, avens, persicaria, frost weed, jewelweed.

Buds, Blossoms or Foliage: Poplar, birch, willow, apple, pear, peach, alder, hazel, beech, ironwood, hornbeam, blackberry, blueberry, spruce, arbor vitae, Mayflower, laurel, maple, spicebush, partridge berry, sheep sorrel, aster, green ovary of bloodroot, clover, purslane, wood sorrel, yellow sorrel, heuchera, chickweed, catnip, cinquefoil, buttercup, speedwell, saxifrage, live-for-ever, meadow rue, smilax, horsetail rush, azalea, false goat's beard, dandelion, cudweed.

Fruit: Rose hips, grapes, smooth sumac, dwarf sumac, staghorn sumac, scarlet sumac, poison ivy, partridge berry, thorn apple, cockspur thorn, scarlet thorn, mountain ash, wintergreen, bayberry, blackberry, huckleberry, blueberry, cranberry, sarsaparilla berries, green-brier, hairy Solomon's seal, smooth Solomon's seal, black raspberry, raspberry, domestic cherry, cultivated plum, wild black cherry, wild red cherry, elder, red elder, black haw, nannyberry, withe rod, maple-leaved arrow wood, high-bush cranberry, mountain cranberry, snowberry, feverwort, black huckleberry, black alder, flowering dogwood,

bunchberry, cornel, silky cornel, pepperidge, mulberry, bittersweet, manzanita, barberry, Virginia creeper.

Economically, the ruffed grouse is an asset, for besides the above listed vegetable food, it subsists also on all forms of insect life, including the caterpillars and larval stages of many other harmful insects. In places where the bird is plentiful, if any such exist today, it sometimes proves itself a nuisance in the budding of fruit trees.

RING-NECKED PHEASANT (*Phasianus torquatus*). The ring-necked pheasant, besides receiving the homage of the epicurean, merits admiration from the lover of beauty. The rich, iridescent greenish purple head and neck of the male, above his bronzed breast, make him an attractive figure wherever seen. He carries himself with an air of hauteur when at his ease, which breaks into ridiculous cowardice when he is alarmed and fleeing. He takes to the air with a vigorous flapping of the wings, accompanied by an unlovely, raucous squawking.

The first introduction of ring-necked pheasants which met with success was that of Judge O. W. Denny, in 1881, when he was consul-general at Shanghai, China. He sent a shipment of 28 pheasants to Oregon from China, and in this climate they rapidly adjusted themselves and multiplied. In 1894 breeding birds were obtained from Oregon and sent to Massachusetts, when the propagation of pheasants got its start in the eastern part of our country. It is possible that many of our birds are hybridized with the English pheasant which had been kept on the English game preserves for centuries past.

The pheasant, since its introduction into the Peterboro region, has become the most numerous game bird in that territory, and no day's walk is complete without having flushed half a dozen or more individuals of this species. Pheasants find ample cover throughout the area in the open sedgy marshes, from which they may be flushed only by the use of dogs, as they run along under the tall grass, and there is plenty of room for them to circle and double back through the same marsh without having to take wing (Fig. 21). They seem to have gained a definite place in the avifauna of the region and now need little encouragement, for they multiply rapidly and are able to cope with fair success against their natural enemies. One of these enemies here is probably the fox, especially since the birds roost on the ground much of the time. In certain winters the goshawk is probably responsible for some losses. The crow, for all we actually know about it, may be an enemy, but the fact is that the

pheasant has increased steadily despite any natural enemies, and this situation can be ascribed chiefly to protection from excessive shooting.

Economically the bird is injurious only locally. The chief complaint comes from the farmer whose sprouting corn it pulls. The species eats a great variety of food, however, both vegetable and animal. The vegetable food comprises seeds, buds, stems, and succulent shoots of spring plants. There are many insects in the bill of fare, some of them highly injurious, so that the bird is of important service in this respect. Among the insects most commonly consumed are tomato worms, cucumber beetles, squash bugs, cut-worms, wire worms, white grubs, potato beetles and cabbage worms. It also attacks the enemies of fruit trees, such as the codling moth, apple worm, tent caterpillar and the adults of tree-borers.

Pheasants sometimes have difficulty in finding sufficient food during severe weather in winter, so it is the practice of many farmers to scatter grain at certain places, to which the birds soon become accustomed to come for food. Indeed, were it not for this provision many would probably perish during severe weather. The birds roost on the ground much of the time, but in severe winter weather they take to the trees for protection, finding roosting places in hemlock and other coniferous trees.

During the time spent on this tract I noted an interesting incident which bears out accounts of the pugnacity of this bird. A soaring marsh hawk about a quarter of a mile away from me suddenly swooped downward and when about three feet from the ground was met by a cock pheasant which rose to meet it. This occurred three times as the hawk rose and repeated its dive, the pheasant uttering its hoarse alarm cries at each sally. By this time, two crows which had been quick to arrive on the scene, attacked the hawk, and it flew off. There was probably a hen pheasant and a brood of chicks in the immediate vicinity, upon which the attack of the hawk had in the first place been directed, and the cock may simply have been defending his own.

The future of the ring-necked pheasant, the Hungarian partridge, or introduced species of any other sort, depends upon the interest taken in their propagation and protection by sportsmen and others directly concerned with such projects. Those who are in position to know, tell us that the propagation of the ring-necked pheasant and other exotic species may be attended with little more difficulty than is the raising of domestic poultry. Pheasants have been propagated on English game preserves for a great many years, and there are professional gamekeepers in New England as well as other parts



Fig. 43. Pond above the beaver dam, showing the irregular contour of the dam itself. October 23, 1930.



Fig. 44. More extended view of the beaver pond which merges with Miller's Lake. October 23, 1930.



Fig. 45. Recent cutting at Peterboro beaver pond. October 23, 1930.



Fig. 46. Beaver pond between the old border of Miller's Lake and the dam. The water in the foreground completely submerges the banks of Oneida Creek below Miller's Lake. October 23, 1930.

of this country, who have made a financial success of this business. Much experience has been gained in all this time as to methods of handling, and good advice can be had from federal agencies and other sources, in various sections of the country, which will enable one to undertake pheasant raising for stocking or breeding purposes, with full confidence of success. So far as this species of game bird is concerned, therefore, there would appear no reason why it might not be maintained in numbers commensurate with the size of the area.

HUNGARIAN PARTRIDGE (*Perdix perdix perdix*). Perhaps the main factor to consider with regard to this species is that of habitat. In all places where the Hungarian partridge has been successful in North America, the open, cultivated areas seem to have the preference, although the species will seek thickets for cover in times of danger or in inclement weather. The Hungarian partridge has been introduced in the near vicinity of Peterboro, namely, at Munnsville, several miles to the east, and at Sherrill, to the north. Within the past year (1929), individuals have been seen near Clockville, and at points not more than three miles north of Peterboro Swamp.

The Hungarian partridge has been introduced with marked success in the Middle West and in Western Canada, but all these introductions have been made in the wheat or corn belts.

As an example of the rapidity with which the species will spread in suitable environment I may give a few notes regarding the bird in Northwest Iowa. About 1910, the Hungarian partridge was introduced into Lyon and Osceola counties, the two northwestern counties of the State. To date the species has spread to five other counties in Iowa and to the three southwestern counties of Minnesota, and it is furthermore probable that it could be found west of Lyon County in South Dakota. In a territory which is not entirely open, I do not believe the birds will succeed without continuous stocking; that if the original introductions are left to themselves they will disappear within a few years.

The Hungarian partridge is a beautiful little bird, slightly larger than our native quail and having many of the same habits. Its distinguishing field mark is the rich russet of the upper tail feathers, which is plainly seen as the bird flies away from one. Another mark, but one which is not easily seen, is the black crescent on the lower breast and belly. Otherwise the bird is a uniform brownish gray with buff bars on the sides and flanks.

Unlike the ring-necked pheasant, these birds are not polygamous, but mate in pairs. During the winter months they are gregarious.

and large flocks will be seen in the corn fields of the Middle West, for example, wherever they have gained a foothold. By the middle of February, however, these flocks begin to break up, and from that time on the birds are seen in pairs. During the flocking season the birds are extremely wary and difficult to approach, but when paired they are remarkably tame and in areas in which they have become reasonably common, frequently fall victims of speeding cars.

It has been said by some that the Hungarian partridge should do well in ring-necked pheasant habitat, which is very true providing there are no pheasants. But the ring-necked pheasant is hostile to the presence of other gallinaceous birds of the same habitat preference. In Osceola and Lyon counties, Iowa, above referred to, the Hungarian partridge had become fully as common as the ring-necked pheasant ordinarily becomes. There were then no pheasants in the region. Within the past few years, however, the ring-necks are coming in and the partridges are going out. Farmers do not welcome the change, for the partridge is a peaceable citizen and does no material damage to the crops. He will also live side by side with the prairie chicken, with no molestation on the part of either (Rowan, '27).

Whether the species will prove an asset or a liability, economically, in this country largely remains to be seen. Thus far I have read of no complaints regarding any propensity the species may have for invading gardens or farm crop fields. With so many other habits in common with our native quail, it is reasonably safe to assume that it is like that species in its feeding habits also, subsisting largely upon insects and the seeds of noxious weeds.

The success of the introduction of the species into the Peterboro area is largely a matter of conjecture, with the odds on the negative side. Knowing the territory in which the species has been successful in Northwest Iowa, it seems to me that the hilly territory of the Peterboro region contains more woodland than is desirable. The ring-necked pheasant is not averse to the shelter of trees in times of bad weather, but the Hungarian partridge requires large open range and for that reason I consider the outcome of the experiment with this species highly uncertain.



Fig. 47. Oneida Creek just as it enters Miller's Lake which may be seen in the background. October 23, 1930.



Fig. 48. View of the alder swamp showing the sort of surroundings the beaver selected in which to build. October 23, 1930.



Fig. 49. Beaver lodge in Peterboro Swamp. The snow behind the fringe of shrubbery in the middle-ground covers Oneida Creek. December 18, 1930.



Fig. 50. This view shows how the apparent symmetry of the beaver lodge is broken on the west side. The presence of marsh shrubbery would indicate the newness of the building project. December 18, 1930.

BIRDS AND THE CONTROL OR SUPPRESSION OF INSECT PESTS

It has been estimated that the loss to the agricultural interests of the United States through insect depredations is \$700,000,000 annually. What this loss would amount to without our insectivorous birds is beyond calculation. In fact, our very existence would be threatened without them, for no form of vegetation could long endure without the protection of our insect-eating birds.

There are mammals which are insect eaters but they are of much less importance because of their limitations. There is no form of terrestrial vegetation which is not accessible to some bird, and many aquatic forms are under the protectorate of our water fowl. From the grass of the meadow to the tops of the highest trees birds seek for food.

Through its powers of flight, a bird is a free agent, and the scope of its activities is enormous. It is natural for a bird to feed upon that which is most abundant and easiest to secure; thus it will be seen that the value of birds in times of insect plagues is great. Gathering at the plague-ridden locality in great numbers, the thoroughness with which they "cover the ground" enables them to keep under control and often to suppress entirely a scourge of insects.

There are recorded instances in which birds have been attracted by artificial means to points where insects were damaging crops. A certain Iowa farmer harvested no corn from the first three rows in his field lying next to a sod of bluegrass. The bluegrass harbored grasshoppers which fed almost exclusively on the growing blades of corn. Acting on the suggestion of a friend he placed 21 bird houses of various types at a distance of two rods apart. The first year these houses were up, thirteen of them were inhabited — 6 by wrens, 4 by bluebirds, and 3 by martin colonies. That fall he harvested 23 bushels of corn from the three rows next the bluegrass.

Cases in which grasshoppers or crickets have been kept under control or suppressed entirely by birds are not uncommon. Perhaps the greatest of these is the story of the plague of black crickets which visited Utah in the early days of the Mormon settlements there. The crops were being destroyed, as these insects were legion. Suddenly a great flock of California gulls (the western representative of our herring gull) appeared as if sent by Providence. They remained till the crickets were entirely eradicated. Complete credit due the birds was recognized by the people of Utah in the placing of a \$40,000 monument to these birds in Salt Lake City commemorating their timely appearance.

Even the despised English sparrow redeems himself at times by his fondness for cicadas or periodic locusts and often keeps these creatures from becoming a menace to shade or ornamental trees.

One of the most potent agencies in the keeping down of insect pests is the family of woodpeckers. Several species of woodpeckers are present in New York throughout the year, and their work in winter is especially valuable. When the stormy days come and the bark of the trees has been well gleaned, then the birds find the dead trees and stubs and begin to explore them inwardly. Here are to be found the eggs of many tree-borers as well as hibernating adults which fall a prey to the diligence of the woodpeckers.

I believe there is scarcely any form of insect life, either in the larval stage or the adult, which is not eaten by some bird. The hard shell of the beetle, the stiff fuzz of the caterpillar, and the tangled webs of webworms are not always a protection to their owner. Potato beetles disappear before the horned lark and I have found from six to twenty of these birds in large potato fields north of Syracuse. The red-eyed vireo will feast to repletion on webworms, and the cuckoos eat some of the hairy caterpillars.

A time when the value of birds as devourers of insects is evident is during the fall and spring when the farmer is plowing his fields. I have had a flock of Franklin's gulls follow my plow in Iowa day after day. Crows, grackles and robins find many a white grub and cutworm and will make regular trips between the field and the nest so long as the plowing is continued, and complete suppression of white grubs by crows is not unusual.

Ants have their arch-enemy in the flicker. I have known several individuals of this species to visit an ant hill day after day until its inhabitants were exterminated or the few remaining had moved to other quarters. White ants or termites are exterminated in many localities by the English sparrow.

One of the great foes of the cabbage worm is the chipping sparrow which is a common resident of our lawns and gardens in summer. Winter birds take toll of the pupated worms. One observer noted the location of 500 chrysalids of this worm along an old fence in the autumn; by spring this number had been reduced to 43 by the feeding of winter birds. Tomato worms are a delicacy enjoyed by crows, while crows, meadowlarks and starlings will often keep under control the various species of cutworms.

Here again we should speak of the roaming "tabby." She is inimical to game birds largely during the season of rearing young, but to our small song and insectivorous birds she is a menace the year

round. Stealthy and crafty in her movements she leaves many a brood of nestlings parentless, and destroys even the nestlings themselves. Few nests are inaccessible to cats. Again it is the homeless cat which is more often responsible for these outrages and her wildness makes her difficult to apprehend.

One of the hardest situations with which the bird protector has to contend is the foreigner who in his quest for meat for the table will shoot and carry home with him anything that wears feathers. He appears to have no respect whatever for our protective laws; admonitions go over his head, and he ignores completely the posting of farms and private land. This attitude is partially explainable by the fact that in his native country in Europe there are lacking the legal measures to insure protection for songbirds, and the bird there belongs to whomsoever may secure it. Small birds of all kinds are exposed for sale in the markets, and this practice has been carried on so consistently in Italy especially, that there is a dearth of song birds except during the spring and fall migration seasons.

The foreigner who hunts for food, however, is far less despicable than that pseudo-sportsman who will deliberately make out a case against some beneficial or harmless species simply to have something living to shoot at or to satisfy his base craving for killing something.

RAPTORIAL BIRDS AND RODENT CONTROL

Seldom it is indeed that the agriculturist fully recognizes what a powerful and valuable ally he has in most of our hawks and owls. Prone to look upon all hawks as "hen hawks" and all owls as destroyers of poultry, he sees one of these birds only as it descends on occasion upon his chicken yard and bears off a straggling victim. I use the term "straggling" purposely, for it is my belief that the majority of barnyard fowls that are the prey of the invader are individuals which are more or less unfit and which in many cases would probably not have reached a healthy maturity if they had escaped the talons. It is a fact supported by ample evidence that the so-called "chicken hawk" (the large bird, with the heavy, lumbering flight) is generally the most beneficial of our hawks, while the true culprits in most instances are the swiftly-darting Cooper's, sharp-shinned and pigeon hawks. These are terrible and swift in their onslaughts and by their agility make a quick and safe get-away, and while daring, they quickly take to cover and so receive little attention from the poultryman.

It is not to be denied, however, that the large hawks (red-tailed, red-shouldered, and marsh hawks) do help themselves to an occa-

sional chicken from the barnyard. But could the owner of the chicken follow one of these individuals as it flies back and forth across his farm, he would see it pause suddenly over a meadow or swale, drop like a plummet upon an unsuspecting mouse or other small rodent and bear it wriggling away; or, winging its way across a clover field or through the orchard, it will swoop suddenly down upon a rabbit, girdler of orchard trees, and carry it off impervious to the plaintiveness of its screams. These acts, repeated many times in the course of a day, offset adequately the loss of an occasional fowl. Then, too, if the farmer is willing to view the matter broadly, cannot the luxury of a fowl at intervals be considered sufficient recompense for service rendered?

Farmers and sportsmen often become enthusiastic over the payment of bounties on predacious birds and mammals, and in many instances seek to destroy indiscriminately all species of so-called harmful birds without allowing much of an opportunity for their defense. Wherever the granting of a bounty seems at all advisable, it should be a matter of local control and seldom if ever should embrace a large area. The bounty system in itself is open to so many abuses that the efficacy of its use at any time is to be seriously doubted. There has in all probability never been a bounty in force in any region which did not invite abuse and illegal acts. The ease with which the object of the bounty may be brought in from outside the territory covered is always to be considered, and fraud of this sort has always been a notorious evil of the bounty system. In addition, a bounty is not always levied with the most altruistic of motives. It has not been many years since a large powder-manufacturing concern in this country attempted to institute a nation-wide bounty on crows. Ostensibly this was done to reduce the numbers of the crow, but the sales of shot-gun shells and rifle bullets doubtless increased to an enormous extent. Nor was the campaign carried on with absolute honesty. Bulletins were published showing with pictures the immense amount of damage done by the fish crow of the Atlantic seaboard in the destruction of the nests and eggs of sea birds of various species. Trouble was not taken, however, to specify the bird as the fish crow; he was simply mentioned as the "crow," and there are many destructive habits of one species which are not held in common by other species in that family.

Another factor which appeared to me to be out of harmony with such a venture was the fact that the company which was paying the bounty and carrying on the campaign was doing so throughout the nation. It seems to me that no firm, individual, or organization



Fig. 51. The height of the beaver lodge may be compared with that of the man standing beside it. December 18, 1930.



Fig. 52. Feeding operations of the beaver. Often, after the branches have been peeled as shown here, they are dragged to the lodge and placed on the top of it. December 18, 1930.

from outside a state should have a right to pay a bounty on any wild life within that state, or be permitted to institute any sort of contest which will reduce its numbers generally. Few birds or mammals are universally harmful; where they increase to such an extent as to be inimical to either the agricultural or sporting interests of any locality, it should be a matter of local concern only, and no interference should be allowed on the part of individuals who are interested purely from a commercial angle.

The ornithological world is familiar with the story of Pennsylvania's so-called "scalp act" of 1885. During that year the Legislature of that state provided a bounty on hawks, owls and weasels killed in the State, amounting to fifty cents each, with twenty cents granted the notary taking the acknowledgment. In a year and a half from the time of the passage of the act, \$90,000 had been paid out in bounties, representing the destruction of at least 128,571 of the animals above mentioned, most of which were hawks and owls.

Supposing that 5,000 chickens were killed annually in Pennsylvania by hawks and owls and that they were worth twenty-five cents each (considering that many are killed when very small), the poultry taken in the year and a half would be valued at \$1,875. Therefore, it appears that \$90,000 was paid out to save the farmers \$1,875. Furthermore, suppose that in one year each hawk and owl destroys a thousand mice or their equivalent in insects, and that each mouse would cause a loss of two cents annually. Thus it will be seen that the money value of each hawk or owl would be twenty dollars a year, or thirty dollars in a year and a half. So, in addition to the \$90,000 already paid out by the State, a total loss of \$2,631,420 annually was incurred, or \$3,947,130 in the year and a half. Stated otherwise, the State threw away \$2,105 for every dollar saved. In addition to this, the destruction of so many hawks and owls removed the natural check on mice and other small rodents, bringing about an abnormal increase in the numbers of these animals which would menace agricultural interests for a period of years.

Piper ('08) tells of an outbreak of field mice in Nevada, Utah and Northeastern California in 1907 and 1908. In the valley of the Humboldt River the number of mice was estimated to be from 8,000 to 12,000 to the acre. The fields were honeycombed by their holes, and many fields of alfalfa were a total loss by the time these rodents had fed on them during the winter. In discussing the remedies for such a condition, Mr. Piper (p. 304) says: "Most noticeable among the agencies which finally overcome them are predaceous birds and mammals. Attracted in large numbers to the feast, they live almost

exclusively on mice during these periods, and, particularly in winter, make such severe inroads on the mice as to attract general attention. . . . A conservative estimate places the number of predaceous birds which appeared in the stricken district in Humboldt Valley at 2,000; the predatory mammals at 1,000. It may be assumed that these 3,000 natural enemies would each destroy an average of 15 mice per day, or 450 per month, or collectively would kill 45,000 mice a day, or 1,350,000 a month."

The last word in the discussion of birds as devourers of either rodents or insects should be spoken of by the scientist who makes examination of the stomachs of individuals taken. Fisher ('93) takes up in detail the stomach contents of various species of hawks and owls. In discussing the red-tailed hawks, one of the species most commonly known as a "chicken hawk" and greatly maligned in consequence, Dr. Fisher says: "Meadow mice seem to form the staple article of its food, although at times other species of mice, arboreal and ground squirrels, rabbits, or an occasional mole or shrew are found among the stomach contents. This hawk and its allied species render valuable service in reducing the numbers of ground squirrels (*Spermophilus* and *Tamias*) and rabbits, so abundant and excessively injurious to crops in some parts of the west.

"Of 562 stomachs examined by the author, 54 contained poultry or game birds; 51, other birds; 278, mice; 131, other mammals; 37, batrachians and reptiles; 47, insects; 8, crawfish; 13, offal; and 89 were empty. It has been demonstrated by careful stomach examination that poultry and game birds do not constitute more than 10 per cent of the food of this hawk, and that all the other beneficial animals preyed upon, including snakes, will not increase this proportion to 15 per cent. Thus the balance in favor of the hawk is at least 85 per cent, made up largely of various species of injurious rodents—a fact that every thoughtful farmer should remember."

Another large hawk which is present in central New York in some numbers during the winter and which comes down to us at that season of the year from regions farther to the north, is the rough-legged hawk. It is conspicuous by the lighter upper throat and breast, and the dark band almost black, across the lower belly. Dr. Fisher (l. c.) in examining the stomach contents of this species found in 49 stomachs examined, that 40 contained mice; 5, other mammals; 1, lizards; 1, insects, and 4 were empty. He says also that the southern boundary of this hawk's visits coincides with the southern boundary of the habitat of the meadow mouse, indicating a fondness of this hawk for that diet.

During the past few winters, sportsmen in Madison County have developed an interest in the winter visits of the snowy owl and of the goshawk (see plates 2 and 3). During the three winters that the Peterboro area has been under my observation, I have seen no snowy owls whatever, and only an occasional goshawk. Mr. P. E. Clock, a taxidermist in Canastota, has, however, had specimens of each species brought to him from various parts of the county, so that those species do occur here in some numbers every winter. It is to be doubted, in the case of the snowy owl, whether the amount of damage done to game by this species is very great, except in the case of flight waves, and the harm done in such an event is a matter for local concern only.

Of the species of raptorial birds seriously inimical to the successful rearing of game, the goshawk appears to be the only one which visits the Peterboro region with any regularity, and it is not abundant there. At long intervals, food in the northern part of North America may become scarce, which seems to cause a flight of these birds in especially large numbers to the Eastern United States. One such flight occurred during the winter of 1926-1927. Mr. George M. Sutton, of the Board of Game Commissioners of Pennsylvania, made a study of this flight (see Sutton, '27). He examined 251 stomachs collected during the winter with the following results: "49 were empty; 41 held poultry (36, chicken; 1, domestic duck; 1, guinea fowl; 3, domestic pigeon); 79 held game-birds (55, Ruffed Grouse; 1, Blue-winged Teal; 8, Ring-necked Pheasant; 15, Bob-white); 73 held game mammals (63, Cottontail Rabbit; 10, Gray Squirrel); 27 held small birds (19, Sparrow-like birds, species not certain; 2, English Sparrow; 1, Robin; 1, Song Sparrow; 1, Meadowlark; 2, Blue Jay; 1, Hairy Woodpecker); 16 held small, non-game mammals (5, Red Squirrel; 1, Chipmunk; 3, Field Mouse; 7, White-footed Mouse); two held small snakes, and one held flesh of a dead sheep upon which the hawk was feeding when shot. . . ."

Thus it will be seen that the goshawk is one of the most harmful birds of prey and a reduction in its numbers from the point of view of the preservation of wild life is to be recommended in any locality where it may appear to be too plentiful in the winter season.

Perhaps one of the greatest destructive agencies of smaller game and other useful wild life is all too frequently unsuspected by the agriculturist, if not by the sportsman. That is the farmer's cat. I know of one dairy barn in the Peterboro region which at the time of my investigations harbored at least ten cats. Most of these were the increase from two females which produced perhaps three or four



Plate 2. Group of winter birds of prey taken in Madison County during winter of 1926-1927 and mounted by P. E. Clock, taxidermist, of Canastota. Center bird, snowy owl; end birds, top row, American goshawks; bird at right end second row, Cooper's hawk; left end bottom row, barred owl; third from left at bottom, great gray owl; all others, great horned owls. Photograph by courtesy of Mr. Clock.



Plate 3. Group of winter birds of prey taken in Madison County during the winter of 1926-1927 and mounted by P. E. Clock, taxidermist, of Canastota. Center bird, American hawk owl; top row, left to right, goshawk, great gray owl, rough-legged hawk, snowy owl, goshawk; all others, snowy owls. Photograph by courtesy of Mr. Clock.

litters annually. The nursing individuals were kept hunting assiduously to provide meat for their growing young.

Even regular and generous feeding of these animals does not prevent them from hunting wild birds. No matter how domestic a cat may become, nor how gentle and innocent appearing it seems, there is still that wild instinct which generations of association with civilized man cannot eradicate, and which will assert itself at every opportunity. Cats will go far afield after game in the night and they are then commonly to be seen along the country roadsides at all hours. But even during daylight hours it is also seldom possible to drive very far through rural districts without seeing from one to four or five of these felines hunting through the fields or along the roadsides. While their inroads, taken the year around, are largely upon smaller birds, they prove a menace to game birds during the time of hatching and rearing of young. Sportsmen who would serve the best interests of game protection would do well to shoot every cat they see hunting in the fields. The proper reduction of the number of cats in rural communities would insure the successful rearing of many a brood of young birds, and at the same time would reduce the present danger of extermination which threatens many of our beneficial birds of prey. There is not the slightest doubt that a large percentage of the depredations popularly and erroneously charged to predatory birds (and wild predacious mammals) in many localities, is actually committed instead by the unsuspected and innocent looking domestic cat.

Another element in the defense of our raptorial birds is the hunting dog which is allowed to run at large over the country. Yes, there is a law which compels the owner of a hunting dog always to have him tied up, but is this law always enforced? The thoroughness with which many of these animals hunt is a menace to wild game, both bird and mammal, together with the speed with which they are able to cover the hunted area. These dogs are not, as is the case with many hunting cats, strays, but are legitimate property and are protected by the payment of a license fee. Therefore some measures should be taken to hold the owners responsible for any mischief they may cause while running at large.

LIST OF BIRDS OF THE PETERBORO REGION

This list includes some which I have added since the summer of 1927, and a number which have been taken in the region in the past five years and are now in the collection of Mr. P. E. Clock of Canastota. Those in the Clock collection are marked with an asterisk.

1. Herring Gull..... *Larus argentatus* Pont.
2. Black Duck..... *Anas rubripes* Brewst.
3. American Bittern.... *Botaurus lentiginosus* (Montag.)
4. Great Blue Heron... *Ardea herodias herodias* Linn.
5. Green Heron..... *Butorides virescens virescens* (Linn.)
6. Woodcock *Philohela minor* (Gmel.)
7. Spotted Sandpiper... *Actitis macularia* (Linn.)
8. Killdeer *Oxyechus vociferus vociferus* (Linn.)
9. Ruffed Grouse..... *Bonasa umbellus umbellus* (Linn.)
10. Hungarian Partridge. *Perdix perdix perdix*
11. Ring-necked Pheasant *Phasianus torquatus* (Gmel.)
12. Mourning Dove..... *Zenaidura macroura carolinensis* (Linn.)
13. Marsh Hawk..... *Circus hudsonius* (Linn.)
14. Sharp-shinned Hawk *Accipiter velox* (Wils.)
15. Cooper's Hawk..... *Accipiter cooperi* (Bonap.)
16. Goshawk* *Astur atricapillus atricapillus* (Wils.)
17. Red-tailed Hawk.... *Buteo borealis borealis* (Gmel.)
18. Broad-winged Hawk. *Buteo platypterus platypterus* (Vieill.)
19. Rough-legged Hawk. *Archibuteo lagopus sancti-johannis*
(Gmel.)
20. Sparrow Hawk..... *Falco sparverius sparverius* Linn.
21. Barred Owl..... *Strix varia varia* Barton.
22. Great Gray Owl*.... *Scotiapter nebulosa nebulosa* (Forst.)
23. Screech Owl..... *Otus asio asio* (Linn.)
24. Great Horned Owl*. *Bubo virginianus virginianus* (Gmel.)
25. Snowy Owl*..... *Nyctea nyctea* (Linn.)
26. Yellow-billed Cuckoo. *Coccyzus americanus americanus*
(Linn.)
27. Black-billed Cuckoo.. *Coccyzus erythrophthalmus* (Wils.)
28. Belted Kingfisher.... *Ceryle alcyon* (Linn.)
29. Hairy Woodpecker.. *Dryobates villosus villosus* (Linn.)
30. Downy Woodpecker.. *Dryobates pubescens medianus*
(Swains.)
31. Yellow-bellied Sapsucker *Sphyrapicus varius varius* (Linn.)

32. Northern Flicker.... *Colaptes auratus luteus* Bangs
33. Chimney Swift..... *Chaetura pelagica* (Linn.)
34. Ruby-throated Hum-
mingbird *Archilochus colubris* (Linn.)
35. Kingbird *Tyrannus tyrannus* (Linn.)
36. Crested Flycatcher... *Myiarchus crinitus* (Linn.)
37. Phæbe *Sayornis phæbe* (Lath.)
38. Wood Pewee..... *Myiochanes virens* (Linn.)
39. Traill's Flycatcher... *Empidonax trailli trailli* (Aud.)
40. Least Flycatcher..... *Empidonax minimus* (W. M. & S. F.
Baird)
41. Prairie Horned Lark. *Otocoris alpestris praticola* Hensh.
42. Blue Jay..... *Cyanocitta cristata cristata* (Linn.)
43. Crow... *Corvus brachyrhynchos brachyrhynchos*
Brehm
44. Starling *Sturnus vulgaris* Linn.
45. Bobolink *Dolichonyx oryzivorus* (Linn.)
46. Cowbird *Molothrus ater ater* (Bodd.)
47. Red-winged Blackbird *Agelaius phœniceus phœniceus* (Linn.)
48. Meadowlark.. *Sturnella magna magna* (Linn.)
49. Baltimore Oriole..... *Icterus galbula* (Linn.)
50. Rusty Blackbird..... *Euphagus carolinus* (Müll.)
51. Bronzed Grackle..... *Quiscalus quiscula æneus* Ridgw.
52. Pine Grosbeak..... *Pinicola enucleator leucura* (Müll.)
53. Purple Finch..... *Carpodacus purpureus purpureus*
(Gmel.)
54. Redpoll *Acanthis linaria linaria* (Linn.)
55. Goldfinch *Astragalinus tristis tristis* (Linn.)
56. Pine Siskin..... *Spinus pinus pinus* (Wils.)
57. Snow Bunting..... *Plectrophenax nivalis nivalis* (Linn.)
58. Vesper Sparrow..... *Poæcetes gramineus gramineus* (Gmel.)
59. Savannah Sparrow... *Passerculus sandwichensis s a v a n n a*
(Wils.)
60. Grasshopper Sparrow *Ammodramus savannarum a u s t r a l i s*
Mayn.
61. White-throated Spar-
row *Zonotrichia albicollis* (Gmel.)
62. Tree Sparrow..... *Spizella monticola monticola* (Gmel.)
63. Chipping Sparrow... *Spizella passerina passerina* (Bech.)
64. Field Sparrow..... *Spizella pusilla pusilla* (Wils.)
65. Slate-colored Junco.. *Junco hyemalis hyemalis* (Linn.)

66. Song Sparrow..... *Melospiza melodia melodia* (Wils.)
67. Lincoln's Sparrow... *Melospiza lincolni lincolni* (Aud.)
68. Swamp Sparrow..... *Melospiza georgiana* (Lath.)
69. Fox Sparrow..... *Passerella iliaca iliaca* (Merr.)
70. Towhee *Pipilo erythrophthalmus erythrophthalmus* (Linn.)
71. Rose-breasted Gros-
beak *Zamelodia ludoviciana* (Linn.)
72. Indigo Bunting..... *Passerina cyanea* (Linn.)
73. Scarlet Tanager..... *Piranga erythromelas* Vieill.
74. Purple Martin..... *Progne subis subis* (Linn.)
75. Cliff Swallow..... *Petrochelidon lunifrons lunifrons* (Say)
76. Barn Swallow..... *Hirundo erythrogaster* Bodd.
77. Bank Swallow..... *Riparia riparia* (Linn.)
78. Rough-winged Swal-
low *Stelgidopteryx serripennis* (Aud.)
79. Cedar Waxwing..... *Bombycilla cedrorum* Vieill.
80. Red-eyed Vireo..... *Vireosylva olivacea* (Linn.)
81. Warbling Vireo..... *Vireosylva gilva gilva* (Vieill.)
82. Yellow-throated Vireo *Lanius flavifrons* (Vieill.)
83. Black and White
Warbler *Mniotilta varia* (Linn.)
84. Yellow Warbler..... *Dendroica aestiva aestiva* (Gmel.)
85. Black-throated Blue
Warbler *Dendroica caerulescens caerulescens*
(Gmel.)
86. Myrtle Warbler..... *Dendroica coronata* (Linn.)
87. Magnolia Warbler... *Dendroica magnolia* (Wils.)
88. Chestnut-sided War-
bler *Dendroica pensylvanica* (Linn.)
89. Black-poll Warbler.. *Dendroica striata* (Forst.)
90. Black-throated Green
Warbler *Dendroica virens* (Gmel.)
91. Pine Warbler..... *Dendroica vigorsii vigorsii* (Aud.)
92. Oven-bird *Seiurus aurocapillus* (Linn.)
93. Northern Water-
Thrush *Seiurus noveboracensis noveboracensis*
(Gmel.)
94. Mourning Warbler.. *Oporornis philadelphia* (Wils.)
95. Maryland Yellow-
throat *Geothlypis trichas trichas* (Linn.)
96. Wilson's Warbler... *Wilsonia pusilla pusilla* (Wils.)

97. Canada Warbler..... *Wilsonia canadensis* (Linn.)
98. Redstart *Setophaga ruticilla* (Linn.)
99. Catbird *Dumetella carolinensis* (Linn.)
100. Brown Thrasher..... *Toxostoma rufum* (Linn.)
101. House Wren..... *Troglodytes ædon ædon* Vieill.
102. Winter Wren..... *Nannus hiemalis hiemalis* (Vieill.)
103. Short-billed M a r s h
Wren *Cistothorus stellaris* (Naum.)
104. Brown Creeper..... *Certhia familiaris americana* Bonap.
105. White-breasted Nut-
hatch *Sitta carolinensis carolinensis* Lath.
106. Red-breasted N u t -
hatch *Sitta canadensis* Linn.
107. Chickadee *Parus atricapillus atricapillus* (Linn.)
108. Golden-crowned King-
let *Regulus satrapa satrapa* Licht.
109. Ruby-crowned King-
let *Regulus calendula calendula* (Linn.)
110. Wood Thrush..... *Hylocichla ustulata ustulata* (Gmel.)
111. Wilson's Thrush..... *Hylocichla ustulata ustulata* (Steph.)
112. Hermit Thrush..... *Hylocichla ustulata ustulata* (Cab.)
113. Robin *Merula migratoria migratoria* (Linn.)
114. Bluebird *Sialia sialis sialis* (Linn.)

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PART 2. LABRADOR POND

INTRODUCTION

The purpose of the present survey of the Labrador Pond area was to determine what special features and advantages or what developmental possibilities this area presents as a wild life refuge or game preserve. With such an object in mind the writer spent four weeks of observation on the tract in the summer of 1927, and made occasional subsequent visits, covering the area thoroughly on foot.

I think it would be difficult to find at the present moment a wilder region in central New York than is the one considered here, and since such areas are now so scarce in the central part of the State it would seem highly desirable if some action could be taken to preserve this Labrador Pond area as a near-wilderness tract while it still presents many suitable features. For even this area is in the eye of the lumberman as well as of the man who would cut the timber for firewood only, and if any steps in the direction of preservation are to be taken they should be taken very soon. Some cutting has already been done, and while this is not extensive yet as a result there are occasional large scars on the hillsides that will last for some years (Figs. 61 and 62).

In addition to native wild life, a consideration kept in mind during this survey, was the possible fitness of the tract for the establishment of one or more of the foreign or exotic species of game, such as the ring-necked pheasant and the Hungarian partridge. Also for such birds the matter of proper cover and of available food supply must of course be the determining factors. While the pheasant is generally considered a bird of the open, it is quite partial to thickets and occasional groves of trees in times of storm. The Hungarian partridge, on the other hand, is a bird more strictly of the open country, and the problem with this species is to find open areas of sufficient extent for its successful existence and propagation.

I wish to express my sincere appreciation to Dr. Charles E. Johnson, Director of the Roosevelt Wild Life Forest Experiment Station, under whose auspices this survey was made, for valuable suggestions and material assistance in the work. A great deal of thanks, also, is due Mr. and Mrs. Hubert J. Wright of Syracuse for many kindnesses and courtesies extended me during my residence on the

tract; and to Mr. Harry Marks, of Tully, I am indebted for much general information about the territory and for other valuable assistance during the prosecution of this survey.

GENERAL DESCRIPTION OF THE TRACT

Labrador Pond is located in the extreme southern part of Onondaga County, New York, its southern end in reality extending for a few rods into Cortland County, so the area covered by this survey lies in both Onondaga and Cortland counties. The pond itself is a small body of water covering about 150 acres and is located three miles south of Apulia, four miles southeast of Tully, and five miles north of Truxton; these distances are by road, not in direct line. The place may be reached by rail on the Delaware, Lackawanna and Western R. R., Binghamton and Syracuse branch, at either Tully or Apulia, and by the Lehigh Valley R. R., Elmira and Cortland branch, at Truxton. The highway leading into the region from the hard road between Tully and Apulia is very rough and illy kept up. The map shows a road from Truxton to the west side of Labrador Pond, but this road has been abandoned by Cortland County from the fork just below Shackham Brook up to the County line.

Labrador Pond (Fig. 53) is three-quarters of a mile in length and in its broadest place is a trifle over a quarter of a mile in width. It is very shallow, the depth not exceeding three feet at any place. The bottom is composed of a soft muck which in the extremely shallow places offers but little more resistance to the passage of a rowboat than the water itself. No pole is long enough to reach hard bottom, and it is this sort of floor that prevents the pond from being popular with the general public. The south end of the pond is becoming over-grown with cow lily or spatter-dock (*Nymphaea advena*) (Fig. 59), which affords a cover for bass, pickerel, and a few trout which are found in the pond. The altitude of the pond is 1,194 feet.

On the east and west sides of Labrador Pond, the land rises abruptly for several hundred feet (Figs. 59 and 60). The altitude of the hill on the east side is 1,964 feet while that to the west is 1,900 feet. The abruptness of this rise can be best imagined when one realizes that the top of either hill is not more than half a mile from the center of Labrador Pond, which would give a 700-foot rise in that distance. On each side the hill is a part of a plateau which extends for two or three miles eastward or westward respectively, being broken only by an occasional shallow valley. The forests on the slopes facing the pond end soon after the top of the hill is



Fig. 53. Labrador Pond, looking northeast from the southwest corner of it, showing how the vegetation comes to the water's edge on practically the whole circumference of the pond. August 15, 1927.



Fig. 54. The south end of Labrador Pond, and in the distance the opening of Tinker Falls valley. This end of the pond is well grown with spatter-dock or cow lily. July 30, 1927.



Fig. 55. View showing the slope of the hills bordering Labrador Pond. July 18, 1927.



Fig. 56. Beech and maple forest at top of hill west of Labrador Pond. Elevation here about 1900 feet. The home of yellow-bellied sapsucker, scarlet tanager, wood pewee, black-throated blue and black-throated green warblers. July 28, 1927.

reached, the plateaus being more open or covered merely with a growth of thorn apple (*Crataegus*), constituting a brushy pasture (Fig. 65).

While the slopes of the hills are difficult to ascend, owing to their steepness, they are much more difficult to descend. The surface is covered with a loose, shelving soil of which a great part is shale rock. This yields very easily to any weight and thus makes very precarious footing, especially when it is covered with dead leaves or concealed by dense growths of vegetation. One cannot see his footing, and upon starting to slip, he is apt to slide along for a rod or more before bringing up suddenly against a tree, stump, or tangle of blackberry vines, all of which is more or less ruinous both to clothing and one's disposition.

The slopes and tops of the hills are heavily timbered (Fig. 56) on the west side of the lake with considerable mature forest, and on the east side with much second growth. The trees found most abundantly are beech (*Fagus grandifolia*) and soft maple (*Acer saccharum*). Other trees occurring in varying degrees of abundance are hemlock (*Tsuga canadensis*), black oak (*Quercus velutina*), black birch (*Betula lenta*), butternut (*Juglans cinerea*), black cherry (*Prunus serotina*), pin cherry (*P. pennsylvanica*), white pine (*Pinus Strobus*), basswood (*Tilia americana*), American elm (*Ulmus americana*), white ash (*Fraxinus americana*), mountain ash (*Pyrus americana*), larch or tamarack (*Larix laricina*), and black alder (*Illex verticillata*).

The areas of larger forest trees do not in all places afford good conditions for ground-loving birds and mammals, as there is little underbrush present, and in many places these areas are pastured.

There is often much snow in winter when many of the established roads within the territory become practically impassable, and temporary roads are made through the fields. As to temperature in winter, the mercury seldom falls lower than twenty degrees below zero, which it may reach at times, but not for long periods. Snow sometimes comes early, the last of October or first of November, and may remain until late March. The summers are said generally to be pleasant. There is plenty of rain, and the sun does not become extremely warm except for a time in August. The climate is considered to be healthful.

The soil seems well adapted to the raising of good crops, although there are now so many abandoned farms in the community that it can hardly be said any more to be an agricultural district; and there is much waste land (Fig. 74). While some dairying is carried

on it is not a popular branch of farming. A great deal of hay is grown, to be shipped to winter markets. Some corn is raised for ensilage, and a great deal of cabbage for the New York market. The soil is clay-like and sandy on the higher ground, while much of the low ground is a black muck. The soil becomes very muddy and wet with a little rain, but dries rapidly on the appearance of the sun.

The east and west divide for north and south drainage of Labrador Pond valley occurs about a half mile north of Labrador Pond and a mile and a half south of Apulia. At this point there is a series of low ridges of irregular contour, making a view across it appear like a huge pan of biscuits, as they are rounded knolls with deep depressions between them, giving evidences of glacial visitation (Fig. 58).

Drainage to the southward is by means of Labrador Creek which is the outlet of Labrador Pond. The creek flows for a mile through a dense swamp and is very sluggish until it strikes a more rocky and firm soil below the swamp, when it becomes a musical, purling trout stream. The stream is very shallow and is about four feet in width for most of its course through the swamp. At the outlet to the pond is a quaking bog covered by a growth of thick black alder and swamp rose. The alders extend along the edge of the creek for its entire distance through the swamp. Just east of the quaking bog and to some extent within its environs, is a considerable growth of high-bush blueberry. The swamp is about a quarter of a mile wide and contains a considerable growth of hardwoods; but the main cover consists of small trees and shrubs, black alder, witch hobble, and moosewood. A good ground cover is provided by various species of brakes and ferns, and in the drier portions by American yew (*Taxus canadensis*).

Drainage to the north is by means of Butternut Creek which flows through the village of Apulia and continues northward until it empties into Oneida Lake. There is another small divide a mile east of Tully, which affords a southwestern drainage into the group of Tully lakes. These streams are all good trout streams, the most common species found being the brown trout. I was told that lake trout had been introduced into Labrador Pond in years past, but had failed to thrive or increase. There is at present quite a supply of pickerel in the Pond and some bass.

The whole area is now practically devoid of game. Of native game, the ruffed grouse should perhaps be plentiful, but I saw not more than a single individual during the four weeks spent on this tract. There were a few black ducks on the Tully lakes, but that

was a few miles west of this particular territory. There are a few snowshoe rabbits or varying hares, and some cottontail rabbits. Red squirrels are common. These various species will be discussed individually later on in this paper.

About the only way to improve the game situation immediately is to post the area against all hunting. The area is very close to three villages, all of which no doubt furnish their supply of hunters each winter. Someone is on the tract all the time in season, either fishing or hunting, so that wild game has little rest. There is an abundance of food, and in most portions of cover, and no shortage of these essential requirements would need to be feared in case more of the ordinary small game species were to be introduced. The territory itself is thinly settled, so intrusion comes almost wholly from the outside.

I know of no organized effort that may have been made at any time to increase the value of this particular tract as a hunting ground. No rod and gun club or anything of the sort is found in the immediate vicinity. I think, too, that there would be little backing by local residents, as there is considerable animosity already shown toward some outsiders who have bought lands in the region and closed them to invaders, so that any posting that is done would have to be rigidly enforced.

Since much of the area consists of steep slopes not adapted to cultivation, it should offer excellent opportunities for reforestation projects. Because of the abandonment of so many farms, the land is low in price, some of it selling recently at three to eight dollars an acre. It will produce trees, as is evident from the areas where substantial stands of timber are now found, and with an eye to providing cover for wild life in years to come, tree planting would undoubtedly prove a successful venture.

THE PRESENT STATUS AND FUTURE POSSIBILITIES OF GAME BIRDS ON THE TRACT

The wildness of this region in general and the abundance of cover and food supply should insure the successful introduction of various species of game birds provided proper protection from enemies may be assured. While altitude and climatic conditions might have some effect upon the success or failure of some species in gaining a foothold, yet I believe it is largely a matter of securing proper and sufficient food and adequate cover, and protection from man and other enemies. The heavy forests of both the swamp and the hillside offer

protection from the blasts of winter, and the great variety of fruiting plants and trees will furnish food attractive to the several species of game birds which are here to be discussed.

There is no doubt that if the full history of this area were available it would show that it has been a territory productive of much game in the past. Perhaps within the memory of persons now living it has been a good hunting ground. But long years of settlement and an ever increasing intensity of hunting have brought these inevitable results and today there occurs only such remnants of local game animals as we usually find anywhere in old settled districts—merely a few individuals which manage to exist for a season or two to be followed by others which may represent their offspring or are invaders from outside territory.

The forms here under discussion are treated largely for their possibilities in the scheme of introduction. A few of them are not found on the area at all, although it must have been the breeding-ground for many of them in more primitive times. Game birds which are considered for this area are black duck, wood duck, woodcock, ruffed grouse, ring-necked pheasant, Hungarian partridge and wild turkey.

Black Duck (*Anas rubripes*) are found in some numbers about the series of Tully lakes, several miles southwest of the village of Tully. There is quite a marsh lying along the D. L. & W. railway right-of-way and I have seen individuals that had taken wing at the passing of a train. Labrador Pond could be made a suitable habitat for the propagation of this and allied species, for its shallowness and muck bottom should provide a fertile field for the production of wild rice, arum, various water-lilies, cat-tails, all of which furnish food and shelter for ducks. It is now disturbed rather too frequently to allow for the success of duckweeds, but should the place be closed to hunting and fishing (for there is not sufficient fishing in the pond itself to be a great lure), these could be made to produce in abundance. The shores of the pond as they are, with their quaking bogs and thickets of blueberries and swamp roses, provide ample cover. There is a solitude about the area which should be very attractive to wild life, could assurance of a continuation of such a condition be given.

Wood Duck. Dr. Eaton, in his "Birds of New York," states that the wood duck (*Aix sponsa*) was once undoubtedly found in every county of the State as a breeding resident during the summer, but now is found only in restricted areas. He also states that it is easily domesticated and bred in captivity, so that under auspicious circum-

stances its successful propagation should be well taken care of. As its name implies, it is a bird of the forest, feeding in or near water, but nesting in hollow trees and often at some elevation. It is one of the most beautifully marked ducks in America and is much to be desired from an aesthetic point of view if from no other. In fact, a number of states protect the bird at all times, and it is not included among ducks eligible for the table during hunting season. Labrador Pond provides a suitable habitat for both the wood duck and the black duck, but their numbers would be limited.

Woodcock. Only once did I flush a woodcock (*Philohela minor*) on this tract. I started one from the swamp a mile south of Labrador Pond about the middle of the day (Fig. 71). The habitat surrounding are well adapted to the species and there is no doubt that it would increase under proper protection. The muck in the swamp and along the edges furnish feeding grounds of acceptable type where it can dip its long bill into the mud and probe about for its accustomed food. This noble American game bird is apparently at the present time facing a critical period in its existence because only a small part of the "ounce of prevention" has been applied in its pursuit by hunters, and people have not yet become sufficiently interested in the "pound of cure." When a general realization of the necessity for its better protection does come it is likely to be much too late, not only in the case of this bird, but in that of other game bird species as well.

Ruffed Grouse. As is the case with the woodcock, the ruffed grouse (*Bonasa umbellus umbellus*) is likewise facing a crisis in its existence if not actually impending extinction in some quarters because of too great a drain on its numbers by hunting during past years. It seems difficult for sportsmen to realize that it is they who are primarily responsible for the depletion of our flocks of game birds, rather than the agencies of disease and of vermin which they are so prone to claim to be the causative factors. Birds like other animals have had their diseases since time immemorial; we are likely to notice the ravages of disease only when a species or a group has been greatly reduced in numbers, usually by human agency. In the matter of vermin, too, birds have always had their natural enemies and so long as neither the one nor the other was undisturbed by man, the balance between them was continued in a natural way.

Not many grouse are to be found in the Labrador Pond region. During the four weeks of my residence on the tract I flushed but one bird, and that on the east side of the pond. Subsequent visits to the

tract in winter have revealed small flocks in the Tinker Falls neighborhood and in the forest just south of Apulia. The cover and food situation is excellent over the entire area, and proper protection would probably restore the species to a higher numerical status. No doubt a few individuals fall prey to foxes and owls, but the continued "dogging" of the region is not conducive to the welfare of its wild game and should be stopped.

The swamp forms excellent cover for the grouse as the wettest portions are thickly grown with black alder, and there is a great deal of witch hobble and moosewood throughout. Many coniferous trees are found here and there, such as tamarack, arbor vitae, and white pine, all of which furnish roosting places and shelter in winter. On the tops of the hills are occasional growths of partridge berry; wintergreen grows in the bogs, and yew berries are common toward the fall. I have found that wherever there is a thick mat of American yew, here one is likely to flush grouse. Beech is the most abundant tree over the entire tract, and there is a considerable quantity of black oak, so that beechnuts and acorns could form a great part of the bird's diet. The fruit of trees is, however, not always produced with regularity, and at the time I was there, I was told that there had been little beech mast for several seasons.

On the east slope of the hill arising on the west side of the swamp about a mile south of Labrador Pond, is a thicket of thorn apples which in good apple years will furnish some food for grouse. This hill is pastured to cattle, however, so there is little cover now available.

Ring-necked Pheasant. I once heard the call of a cock pheasant (*Phasianus torquatus*) from the edge of a hay meadow a mile and a half south of Labrador Pond. On another occasion, while crossing the fields from a trip to Tully, I flushed a hen pheasant and six young from a brushy hillside pasture. I had been told by residents that there were no pheasants in the territory, so these were apparently newcomers. While ring-necked pheasants are considered birds of the open fields that do not ordinarily enjoy the timbered areas, yet they do frequent the upland thickets in times of deep snow, and I have found them roosting in coniferous trees during severe weather. They will sometimes spend much of a day roosting or moving about in trees. They are sufficiently hardy to withstand the rigors of winter if they are able to find food, but they do not appear to be adepts at digging down through the snow for food, consequently if particular effort is not made in their behalf, many may perish in certain winters. It is becoming a common practice of the farmer in regions



Fig. 57. View from north end of hill east of Labrador Pond showing cultivated land and glacial evidence. Cabbage crop in background; corn in middle-ground. Here are found the savannah and vesper sparrows, killdeer, marsh hawk and meadowlark. August 13, 1927.



Fig. 58. View across meadow and swamp north of Labrador Pond. Small burn at top of hill in background.



Fig. 59. Labrador Pond and the hill west of it. The house is an ordinary two-story structure, showing the relative height of the hill. Forest here mostly beech and maple. July 30, 1927.



Fig. 60. Labrador Pond and the hill east of it, taken from in front of the house shown above. The pond is not more than three or four feet deep, and the bottom is covered with muck to a considerable, but undetermined, depth. July 28, 1927.

where the species has established itself to provide grain for these birds through the winter.

The ring-necked pheasants are very prolific, and this together with their vicious or belligerent nature, generally assure their successful establishment. They will not long put up with the company of other gallinaceous birds, and in the Middle West I have known them to drive quail, prairie chicken, and Hungarian partridge out before them. Many sportsmen and game commissioners have a preconceived notion that since two or more species of birds have the same habitat preferences there should be no trouble about their getting along amicably together. This rarely works out in the case of the "ring-neck," and the time will come eventually, I fully believe, when the ring-necked pheasant will have things pretty largely to itself, wherever it is introduced and once becomes firmly established.

Hungarian Partridge. I found two places in the Labrador Pond area in which Hungarian partridge (*Perdix perdix*) might possibly have some small chance of surviving for a time, at least, until it retreats before the ring-necked pheasant, which I would expect to happen. Between the first two ranges of hills directly east of Labrador Pond is a plateau covering at least three hundred and fifty or four hundred acres, which contains a little brush and which was cultivated to a small extent for corn, oats and cabbage (Fig. 74). Such a region would support a limited number of Hungarian partridges, as they are primarily birds of the open. The Hungarian partridge is, to my mind, a much more gamey bird than the ring-necked pheasant and for that reason much more to be desired, despite the fact that it is not such a showy bird when colors are considered. It is more wary, gets up much more rapidly when hunted, and is a much more difficult mark for the sportsmen. Besides these it has other qualities much different from those of the ring-neck. It is largely insectivorous—like our American quail or bob-white—and does not become a pest in the crop-fields of the farmer. It gets along well in the Middle West with the prairie chicken and the bob-white, but it entertains a fear of the pheasant and retreats before its invasions.

Beyond the hill that lies directly west of Labrador Pond is another such plateau as the one above described, which consists of about three hundred acres (Fig. 65). It is lower and much more sloughy than the eastern plateau, and is pastured during the summer. It is practically devoid of trees beyond the forest at the top of the hill, hence it should be an ideal place for partridge. It must be kept in mind, however, that these areas will support only a limited number of the birds, as the range for them is not extensive. I do not think

it possible that the species could be produced here in numbers large enough ever to supply good hunting. Also since the surrounding country is more or less timbered, there is less likelihood of an overflow becoming established here.

Wild Turkey. The wild turkey (*Meleagris gallopavo silvestris*) is coming to be considered in a number of places in connection with reforestation and game restoration projects. Some reforestation has been undertaken in the neighborhood of Truxton, but this area would obviously not be favorable for the propagation of the wild turkey, as the trees started in that region are largely conifers. The wild turkey requires a kind of forest habitat that will provide food as well as shelter, for which purpose beech and oak would be highly desirable.

The large number of abandoned farms in various parts of the East, and in New England in particular, has accentuated the discussion of reforestation, and some practical results are being obtained in some of the areas considered. Mr. Dwight W. Huntington, editor of the Game Breeder, in the issue of that magazine for March, 1921, says in regard to wild turkey and reforestation: "There are many cheap farms in New England and elsewhere and many plantations in the South where Wild Turkey and Quail may be made very profitable, the birds being bred in a wild state in charge of a beat keeper, who should control their enemies and see that the birds have plenty to eat, not only in summer when berries and grasshoppers are plentiful, but at all seasons of the year. Some nuts and acorns as well as grain should be supplied in the winter, and the cheapest nuts and acorns undoubtedly will be found a cheap food which will prevent straying."

The cut-over areas on the Labrador Pond tract have all grown up into thickets of blackberry and raspberry (Fig. 62), and in the swamp and in the sunken places on the top of the west hill are thick stands of high-bush blueberries, which should form a substantial addition to the bill of fare of wild turkeys. The open areas east and west of the pond mentioned as possible habitat for Hungarian partridge might be shared by the wild turkeys in their search for grasshoppers and crickets.

Wild turkeys require standing timber for cover as they are fond of roosting high in the air. There is plenty of both hardwoods and conifers to furnish such protection.

Should such a project as the introduction of wild turkeys be undertaken, it would be well to follow the suggestion of Mr. Huntington, that someone be provided who will see that the birds have

food in winter, and the same person might be invested with the title and authority of custodian or game protector for the protection of other game thereon. While the area itself would be closed to hunting more or less permanently, after a number of years, with all activities and weather conditions making for the success of such an undertaking, the overflow from the area should, it would seem, provide interesting hunting and good sport for the gunner.

Enemies of Game Birds. The chief enemy as I have inferred is the promiscuous running of hunting dogs over the place. Of a piece with this would be the danger, in the event of the region being posted, of the poacher who would hunt or somehow encroach upon the game regardless of laws or restrictions.

Of natural enemies, there are both foxes and owls on the premises. As to how numerous these are, the winter would best show, but seldom did I see tracks which might have been those of foxes, and only in a few cases did I hear the calls of owls. While the land is more or less stony, so far as cultivation is concerned, and there are rock bottoms to such streams as Tinker Falls Creek and Butternut Creek, there are no caves such as would attract foxes.

Raccoon tracks were frequently seen after rain and there was every indication of a considerable number of these animals in the forest there. Red squirrels are common and their whistling, scolding, or chattering could be heard in any part of the forested areas. Few signs of skunks were noted, and I was told that the trapping for skunks in season on this area was not considered very successful. There was a fair number of snakes, mostly water snakes (*Natrix sipedon*) of the swamp, but these, as well as any other species of snake probably found on the area, have, of course, no place in a catalogue of the enemies of game birds.

There are waves of snowy owls in occasional winters, an unusually large one occurring during the season of 1926-1927. In the open areas about Tully marsh, marsh hawks may be of some detriment so far as ring-necked pheasants are concerned, but I have rarely seen these hawks come into the forest for sustenance, although several years ago in a thick forest I came upon a marsh hawk with a freshly killed cottontail rabbit. Goshawks from the north no doubt take a certain toll during some winters, but they, too, like the snowy owl, come in irregular waves so that their inroads need not be a matter of constant concern.

GAME AND OTHER MAMMALS AT LABRADOR POND

The shortest way of disposing of the subject of game mammals on this tract would perhaps be to say, "There are none." And the reason lies, to my mind, with the promiscuous shooting and the general running of hunting dogs. I was walking down a wood path one day when I heard the baying of a hound up in the forest above me; a dog I heard often on this tract but which I had never seen. As I stood listening, a cottontail rabbit burst out of the bushes that lined the path, and stopped to listen, sitting upright not more than a rod in front of me. It did not see me for some seconds and when it did, simply turned its head and listened for the dog. As the sound drew nearer the rabbit loped easily along the path for a couple of rods ahead of me, then took to the bushes on the opposite side of the path from that on which it had entered. In a few moments the baying dog appeared on the trail of the rabbit. It appeared to be a cross between an Airedale and a Beagle, for it had the hideous rough hair of the former and the lopping ears and jowls of the latter. Upon beholding me its baying changed to an angry barking at my intrusion, but after a few moments it apparently remembered its quest and rushed off with its nose to the ground, its baying resumed.

Cottontail rabbits seem to be the most numerous of the ordinarily termed game animals, but even they are not particularly plentiful in this area. They are animals of the more open country and consequently not to be expected in any considerable numbers in timbered tracts. Much of the hay raised in the farming section here is timothy, rather than the various species of cultivated clover, and this may have something to do with the question of the rabbit food supply. I was not able to discover if the species in this region was diseased or not, but at this time in parts of central New York it was popularly supposed to be tubercular and for that reason was not hunted. Tularemia is another rabbit disease which has been afflicting these animals over the United States in general during the past two or three years. This disease manifests itself in a spotted liver and in running skin sores and is communicable to humans through the handling of diseased animals. It is well in any case to give a specimen killed a thorough examination before venturing to dress it.

The varying hare or snowshoe rabbit (*Lepus americanus*) is present, but few in numbers. It is to be found in the swamp about the edges of the pond. There is abundant food supply for these animals in the coniferous trees of the swamps, upon the new buds

of which they frequently feed during the winter, and there are many sapling and seedling deciduous trees of which the bark may be used in times of stress. The varying hare differs from the cottontail rabbit in a number of ways, the most apparent being his winter coat of white. He is larger, and his great splay-feet are like snowshoes, enabling him to get through deep snow with speed; these feet have given him the popular name of snowshoe rabbit. The animal spends the day in forms on top of the ground instead of using burrows or woodchuck holes for shelter as do the cottontails. It would be interesting to know if the diseases of the cottontail are communicable to this form.

On walking through the heavy timber south of the pond one day, shortly after a rain, I found tracks in the path which would indicate the presence of deer. No hogs or sheep were in the immediate vicinity so that there is hardly any question as to the identification of these tracks, and furthermore deer have been reported recently from nearby vicinities at Tully, Cortland and Cincinnatus. Deer adapt themselves easily to changing conditions, and since so much dense woodland is present for cover, and proper food is available, the area could well support a limited number of these animals.

Aside from the mammals mentioned the territory presents other forms which are more plentiful. The largest of these is the woodchuck (*Marmota monax*), which thrives here in considerable numbers. Though ordinarily preferring open land, it is here found very generally distributed over much of the area, and its dens are found as often in the forested part as in the open fields. A woodchuck is, to my mind, a peculiar animal in that he seems to be a creature of one idea, so to speak. This trait it exhibits in an interesting way at times when it is surprised away from its burrow. If a rabbit is aroused from its lair, it scuttles away through the woods in the nearest direction of safety, and if it be a hole in the ground into which it desires to retreat, it will often take a circuitous route to reach it. Not so the woodchuck. The animal recognizes its home nest as the best and nearest safe abode, and if the enemy be between itself and the opening to its den, it seems to be at a loss as to what to do. As an example, I was one day coming down a forest path when I surprised a woodchuck some distance from its burrow, which was behind me. It saw me coming some distance off and came straight toward me, making a bee-line for its domicile. It passed within a foot of me, running as rapidly as it was able, and I struck it across the hind quarters with a stick I was carrying.

No more valiant fighter lives in the wood than the woodchuck, and

there are few more thrilling spectacles than an encounter between one of these animals and an evenly matched dog. The woodchuck also has much of the curiosity common to rodents, and after being driven into its burrow, its head will reappear within a few moments for a scrutiny of its nemesis. The animal is fairly easy to shoot on this account. Woodchucks, because of their digging habits, frequently become a nuisance in cultivated fields, so there are few places posted where the owners will not allow a person to enter to shoot woodchucks.

In the conditions existing on this tract the woodchuck can hardly be said to be of any harm, and it constitutes at least one form of wild life that can be observed and studied on this area by persons interested.

Chipmunks were the most abundant of the rodents found on the tract, and every pile of logs or stones had its chipmunk, and sometimes more than one. Their shrill whistle is frequently heard as they make a startled dive for safety upon the near approach of the intruder. One of the common sounds in the forested parts is their hollow sounding, deliberate "plunk-plunk-plunk," given from a pile of brush or a hollow log. The student of birds will note that it bears some resemblance to the slow, measured notes of the cuckoo, but is more hollow and lugubrious sounding, with some of the quality of dripping water.

White-footed or deer mice (*Peromyscus*) are common over the area and are not difficult to secure by trapping. They will be found about old buildings and about rotting stumps and logs. In the sides of bare banks are found shrews and moles, and in the meadows, bog lots, old orchards and other grassy areas meadow mice are abundant and jumping mice (*Zapus*) common. All these small rodents furnish a supply of food for the predatory birds and mammals found on the tract, and in addition add to the attractiveness of the area for persons interested in animal life.

BIRD LIFE AT LABRADOR POND

My arrival in this area was on July 16, just at the time of year when many of the birds were ceasing their singing, and the period of molting had begun. Few birds sang after this date and had to be located, therefore, by sight rather than by ear. Even cail notes were less frequently heard and many birds when interrupted at their feeding simply flew away or hopped nervously about in silence.

The territory is well adapted to the study of birds because of its variety of habitats. Birds appeared to be present in about the usual



Fig. 61. Looking across Labrador Pond from southeast to northwest, showing recent slashing on side hill. July 30, 1927.



Fig. 62. Near view of slashing on hillside shown above. This has become thickly grown with red raspberries. Habitat of towhee, robin, rose-breasted grosbeak, scarlet tanager, wood pewee, oven-bird, Canada warbler, mourning warbler, black-throated blue and black throated green warblers, chestnut-sided warbler, flicker, hairy woodpecker, sapsucker and hummingbird. August 13, 1927.



Fig. 63. Tinker Falls. A natural amphitheatre is formed here. Very little water here except in rainy seasons. Birds within sight and sound of the falls: indigo bunting, field sparrow, towhee, scarlet tanager, black-throated green warbler, oven-bird, song sparrow and ruffed grouse. July 25, 1927.



Fig. 64. Tinker Falls Creek just below the falls. The shale rock shown here allows the stream to disappear into its depths, reappearing at short intervals. This valley is a rather popular picnic ground as it is open, and secluded from the highway. The repeated disappearance of the stream and its coming to the surface again keeps the water cool and good for drinking purposes. July 25, 1927.

numbers one would expect in such areas. Excellent opportunities are offered for bird study, as most of the habitats are easily accessible; some, however, require the use of wading-boots, and others call for a good deal of climbing of more or less arduous nature. During the four weeks spent on this area, I listed one hundred seven species of birds there and in the immediate vicinity. However, all of these will not be mentioned in this report, except in the general list, since a number of them were seen but once and are not of immediate importance in the present consideration of the territory.

A considerable variety of forest growth and other vegetation has a marked influence in attracting birds by providing cover and by furnishing an ample food supply. Wild berries of a dozen kinds flourish in parts of the various habitats, and there are both acorns and nuts for birds able to make use of such food.

While feathered enemies of birds were more numerous than I had found them in the Peterboro area, yet they were not out of proportion to the great number of song birds found on the tract. The most common was the red-tailed hawk, which I found at three places on the area; and there were several at each place, indicating that broods had been successfully brought to maturity and had left the nests. Other hawks which were present singly or in smaller numbers were marsh hawk, Cooper's hawk, sharp-shinned hawk, broad-winged hawk and pigeon hawk. Three species of owls were noted, but none of them common. I found a dead screech owl in the road one day, which had evidently been struck by an automobile. I heard great horned owls and barred owls at various times at night, but not often.

Tracks were very often seen in the woods that would indicate the presence of foxes, and I was told by residents of the community that these animals were quite common at times. Dogs, also, ranged through the forest and their baying was heard a number of times. Red squirrels were fairly common, and blue jays abundant. Crows were seen every day, but I should not call the species abundant in this particular area, and saw no evidence to indicate that they were a pest in their relations with other birds.

For convenience in the discussion of the bird life found, I have divided the habitat preferences under the following heads: Forest Habitat, Swamp Habitat, Open Slough Habitat, Upland Thicket Habitat, Shade Tree Habitat and Open Field Habitat. These habitats and the chief birds found in each will now be treated in some detail.

Birds of the Forest Habitat. I mean by Forest Habitat the beech and maple forest of the high ground and on the slopes of

the hills (Fig. 56). Besides the two tree species mentioned, there are also found black oak, basswood, white ash, mountain ash, hemlock, white pine and butternut. Many of the forested areas are pastured, so there is little underbrush for cover. There is much cover on the slopes, however, furnished by jewelweed, raspberry, blackberry and small seedling trees. In the unpastured forest are many flowering plants in season, violets, wild ginger, trillium, jack-in-the-pulpit, hepatica, false miterwort, wild leeks and many others. On the tops of the hills is a considerable growth of partridge berry (*Mitchella repens*). The birds of this habitat are numerous as to individuals and of some variety as to species.

RED-TAILED HAWK (*Buteo borealis borealis*). This was the most common hawk found on the area, and its screams could be heard at any hour of the day. Near the north end of the West Hill was a pair of these birds, and their young were leaving the nest just at the time I entered the territory (Fig. 55). Their wheedling, begging cries were heard from the tree-tops for a week, and shortly thereafter they took to the wing and began following the parent birds on quests for food. There were red-winged blackbirds and kingbirds nesting in the near vicinity, and these were in the habit of attacking the hawks at every opportunity. The red-tailed hawk may be easily recognized by its large size and great wing-spread, together with its rich reddish brown tail, which reflects the bright sunlight as the bird turns and wheels in the air. The red-tails are primarily soaring hawks and in late summer and fall they spend much time aloft, seemingly suspended from above, and giving only an occasional flap of the wings to continue their motion.

COOPER'S HAWK (*Accipiter cooperi*), SHARP-SHINNED HAWK (*Accipiter velox*), BROAD-WINGED HAWK (*Buteo platypterus*), and PIGEON HAWK (*Falco columbarius columbarius*). These hawks were also observed, but only singly or occasionally, and none of them in sufficient numbers to be considered as affecting the game situation here materially. It should, however, be repeated here in passing, because of the widely prevalent popular misconception, that it is the Cooper's hawk and the sharp-shinned hawk which would most likely be the cause of any depredations on small game or other desirable wild life that might be observed, rather than the larger "chicken hawks," so called, which usually receive the blame. The Cooper's and sharp-shinned hawks are smaller and more swift in flight, very daring in pursuit of their prey, and sometimes so intent upon its capture that they will venture to within two or three feet of a human being, if necessary.

The SCREECH OWL (*Otus asio asio*) and BARRED OWL (*Strix varia varia*) occur on the tract, but evidently not in any considerable numbers for their calls were not frequently heard. But the numerical status of such birds is of course not easy to determine in a short time, so that it is possible they were more common throughout the forested areas than my observation indicated.

HAIRY WOODPECKER (*Dryobates villosus*) and DOWNY WOODPECKER (*D. pubescens medianus*). These were common throughout the area. The downy was perhaps the more common of the two, or more in evidence. While these woodpeckers may usually be distinguished in the field by their size, the surest mark of distinction for the less experienced observer lies in the tail. The birds are otherwise marked much the same, and it is usually to either of these birds that the casual observer refers when he speaks of a "black and white woodpecker." It should be noted that the outer tail feathers of the hairy woodpecker are pure white, while those of the downy are black-barred. The manner in which these birds "police" the forest trees gives assurance of their economic value, for they are voracious eaters of tree borers and other destructive insects.

YELLOW-BELLIED SAPSUCKER (*Sphyrapicus varius varius*). Aside from its sap-devouring propensities, this bird is beneficial, due to its feeding upon tree insects. The birds do not damage trees to any very great extent through the taking of sap, unless they appear in large numbers. They seem to prefer coniferous trees for sap, although they also attack others. In the territory in question they were found in occasional pairs throughout the heavy forest. The nesting season was over, and at times an entire family could be seen at once in a given group of trees. During the breeding season they are quite noisy, often giving a series of "chirrs" much like those of the red-headed or red-bellied woodpeckers, but at the time I observed them on this tract they were largely silent, and only an occasional call was heard.

CRESTED FLYCATCHER (*Myiarchus crinitus*). Although the season when the calls of this species are most often heard was past, the birds on this tract were still quite vociferous and their harsh squawks were to be heard every few days. The crested flycatcher is a trifle larger than the more common kingbird but may be recognized by its olive color and its distinctive crest which it raises in times of excitement. It is a bird of the thicker woods, where it nests in an old rotten stump or woodpecker excavation. It has a habit of decorating its nest with a cast-off snake skin, but as to what purpose this may serve, one may only guess.

WOOD PEWEE (*Myiochanes virens*). This is one of the most common birds in the forested areas. Its plaintive calls can be heard through the hottest part of a summer's day. How weary it sounds then, in contrast with the sweetness in the cool of the morning. The note, of course, is the same, but it seems to fall on one's ear with a different quality at different hours of the day. Although called the "pewee" the bird must not be confused with the chickadee which sings a little "pee-wee" song, strongly accented on the first syllable and given very promptly and quickly, rather than with the drawl of the wood pewee. The wood pewee's note, too, is a three-syllable, more like "pee-a-wee" with the first syllable accented only slightly more than the last. The nest of this species is placed on a horizontal limb among the middle branches of a tree, and is made of mosses and lichens.

BLUE JAY (*Cyanocitta cristata cristata*). The blue jay is plentiful all year round here, and is said by residents of the community to be equally common in winter. The bird may, in fact, be more common in winter, since there would probably be an increase in numbers due to winter arrivals from points farther north. The blue jay is extremely noisy and very much in evidence wherever found. It is a social boor among birds and is therefore not welcomed, but on the contrary, is often attacked and driven out of an area, especially during the nesting season. The great adaptability of this bird in food habits is conducive to its success anywhere.

CROW (*Corvus brachyrhynchos brachyrhynchos*). One of the commonest American birds, little need be said about this fellow. His economic status is held in serious question in various localities, and its veering one way or another is a purely local condition. In such a region as we have under discussion, he should not figure as a great liability as he is not present in very great numbers; neither is this an agricultural community in which he is liable to injure his reputation through the despoiling of crops or attacks on young poultry. Game birds are not sufficiently plentiful on the area to be a great attraction to him, and there is an abundance of food of other sorts. His status for the present may therefore be considered neutral.

SCARLET TANAGER (*Piranga erythronelas*). The scarlet tanager is one of the commonest birds of the forest habitat. He is a bird of the tree-tops, coming down probably only for water. This was one of the few species still in song up to the middle of August, although it was heard only in the early morning and occasionally in the evening. I had a number of excellent views of the brilliant male near

the ground, and through his oft repeated alarm note of "Pittsburgh" I judged that young were no doubt out of the nest and in the immediate vicinity. The brilliant red body contrasted with the glossy black of wings and tail make a beautiful picture, though one not so frequently seen, for this bird, while musical enough, is rather shy and retiring. The female has a dull olive-greenish hue and may not seem to belong to such a brilliant master as she serves.

OVEN-BIRD (*Sciurus aurocapillus*). I did not hear the song of the oven-bird on more than two occasions after my arrival in the area in the middle of July. I saw the bird often, however, and found it near the ground, giving its sharp chirp of alarm. The finding of the nest of an oven-bird is an event in the life of any bird student, and a thrill which I have never had, although I have seen nests that had been discovered by others. The nest is on the ground among the leaves, and is arched over with grasses resembling somewhat an old Dutch oven, which gives the bird its name.

BLACK-THROATED BLUE WARBLER (*Dendroica caerulescens caerulescens*). This is one of the most common warblers of the wood, although it shows a preference for the lower and middle branches (Fig. 71). It is strikingly marked, having a black throat and breast, and a slaty blue back. A white patch in the wing makes another distinguishing field mark, and the only one which will absolutely identify the female which is olive-brownish in color, lacking the black throat and blue back of the male. These birds are always busy, hopping back and forth among the foliage in their ceaseless search for insects. The male stops at short intervals to give his monotonous, insect-like call, which has very little musical quality. The bird stopped singing about July 21, after which time the call note only was heard, and the birds seldom seen. They were fairly common all through the drier wooded areas of this region.

BLACK-THROATED GREEN WARBLER (*Dendroica virens*). The black-throated green warbler was one of the common warblers of the tract and was in song till the first of August. It also prefers the middle branches of the trees, but its first choice in trees is the conifers. There were not many conifers here, aside from some white pine and hemlock, so the bird was very generally distributed over the territory. I found a young bird that had left the nest, in the Tinker Falls neighborhood, and was able to catch it. The little thing was scarcely larger than a hummingbird, but it put up a vigorous resistance to capture, while the male parent was fluttering about, dragging his wings, uttering cries of distress and otherwise showing his

agitation. During the singing season, the bird is in continual voice, and his "zee-zee-zee-ZEE-zee-zee" is heard from every part of the woods. He, like the male of the black-throated blue warbler, has a black throat and breast, but the back is an olive-greenish hue with occasional black streaks, and two white wing-bars; conspicuous yellow cheeks finish the costume.

REDSTART (*Setophaga ruticilla*). The redstart is a fairly common bird in the mixed forest, especially where there is an abundance of low trees. Along the lower slope of the West Hill and a half mile below Labrador Pond was quite a growth of a species of thorn apple (*Crataegus*), growing amidst the beech and maple. Here the redstart was most often seen, his flashing about from twig to twig having a fancied resemblance to that of an enlarged lightning-bug. The black body of the male makes a sharp contrast with the brilliant red patches of wings and tail. The female is almost as beautifully marked, being olive-green of body, with bright yellow patches replacing the red. No more active bird is found in the forest and it keeps up a continuous hunt for insects.

WHITE-BREASTED NUTHATCH (*Sitta carolinensis carolinensis*). There are few more interesting birds than this little acrobat, who appears in raiment as meticulously kept as that of a butler. His breast and belly are snow-white, while his back is a deep slaty blue shading to black on the crown. He either ascends the tree, or descends it head first; clings to the under side of a horizontal limb, or works his way around it spirally. He keeps up an even, cheerful, nasal chant; nasal, yet with a hollow sound that gives it carrying quality, so that on a still day he can be heard at a surprising distance.

WOOD THRUSH (*Hylocichla mustelina*). This curfew of the forest lets go its bell-like notes just as twilight is deepening into darkness and after most other birds have sought repose. To my ears there is no sound that can compare in sweetness and richness with the evening notes of the wood thrush. The color of the bird is a rich brown above, light below with heavy dark spots, much like those on the breast of an immature robin. Even the call notes of this bird are musical in quality, a thing unusual among alarm notes of birds. The wood thrush is a bird of the small trees and bushes, placing its nest usually at a height of about six feet. During the moulting season the birds remain concealed on the ground amid thick cover, and appear very shy at this time. They stopped singing generally during the first week in August, and the song was seldom heard after that.

There were other birds found in this habitat, but not in



Fig. 65. View along a small run a mile west of Labrador Pond. This stream runs through the open area mentioned in the discussion of the Hungarian partridge. July 28, 1927.



Fig. 66. The above run after it enters the forest. Large flat rocks mark its course for several rods here, until it reaches the section of shale rock where it disappears like the other small hill streams. July 28, 1927.



Fig. 67. Sawmill at the foot of slashing shown in Fig. 62. Robins and phoebes nested under its roof, and the magnolia warbler and Wilson's thrush called from the edge of the swamp behind it. August 13, 1927.



Fig. 68. Bed of Tinker Falls Creek. After a heavy rain the creek runs full of water for a short time. This valley expanded into a small brushy area, the home of towhee, indigo bunting and field sparrow. August 4, 1927.

numbers sufficient to require more than their mention in this paper. Some of these are rose-breasted grosbeak, chickadee, flicker, ruby-throated hummingbird, least flycatcher, towhee, chestnut-sided warbler, winter wren and brown creeper. Some of these belong primarily in other habitats and stray over into the one here concerned only occasionally; but I list them here simply to show what may be expected on a walk through this habitat. Some of them will be mentioned more particularly in connection with other habitat preferences.

Birds of the Swamp Habitat. In discussing the swamp habitat of the Labrador Pond region, I am thinking of two areas of this sort, particularly. The larger and more thoroughly explored of these is the territory already mentioned as extending for a mile or more below Labrador Pond and bordering it on the east. The swamp also extends northward beyond the pond but for a few rods only. The other swamp habitat, in which but few birds were listed that did not occur in the larger one, was along the right-of-way of the Delaware, Lackawanna and Western Railway, about two miles east of Tully and a mile west of Apulia. The bird lists for the two places were, however, very similar.

The swamp habitat was a low, boggy area, covered with fallen, rotting trees and logs, and a dense growth of ferns, brakes and jewelweed (Fig. 71). The stream through these areas was sluggish and shallow, albeit of some width at places. Fallen trees barred its passage at times, forming crossings which I often found convenient. There were many holes left by the uprooting of trees, and these when grown over with vegetation and filled with soft muck would prove treacherous to the unwary woods trampler. A mis-step into one of them would surely be disastrous to clothes as well as to camera or other equipment that one might be carrying. The swamps were not pastured for cattle would not venture into them because of the boggy ground.

The bird life in these areas was both varied and numerous. The trees, although composed of much hardwood, were not large, so that the birds of this habitat were species frequenting the smaller forest trees. Black alders were predominant in the wettest portions, but there occurred also maple, beech, arbor vitae, white pine, hemlock, a great deal of seedling growth, and witch hobble.

Besides the principal bird species mentioned in the paragraphs following, certain others which were present in insignificant numbers, or only occasionally seen, are named here simply to complete the check list for this habitat. There are some in this list which belong

particularly to other habitats, others are primarily game birds and will be treated later under that head. These include black duck, great blue heron, woodcock, ruffed grouse, Cooper's hawk, broad-winged hawk, kingfisher, Lincoln's sparrow, red-eyed vireo, black and white warbler, magnolia warbler, black-throated green warbler, black-throated blue warbler and white-breasted nuthatch. The birds of this habitat which require particular mention are the following:

GREEN HERON (*Butorides virescens virescens*). The green heron was reasonably common over much of the swampy area, and on a number of my walks I found it hidden in a clump of trees from which it flew out with a series of its characteristic unmusical notes and squawks indicative of its surprise. Green herons were often seen along Labrador Pond. Their color seems to me more bluish than green, being a slaty blue on the back and wings, with a streaked brownish throat and neck. The crest is greenish black. These birds feed on small fish, crayfish, frogs and other food which they find along the borders of streams and ponds. They are not sufficiently numerous in this area to disturb the minds of any anglers who might visit the pond, by exciting some fear as to the effect of these birds on the fish supply, hence their place in the economic scale need not here be discussed.

RUBY-THROATED HUMMINGBIRD (*Archilochus colubris*). One of the big thrills which I received during the time spent in this field was the discovery of my first hummingbird's nest. I have in the course of years seen plenty of such nests discovered by others, but I had never enjoyed the satisfaction of finding one on my own account. I had just crossed Labrador Creek on a fallen log in the depths of the swamp one day, when I heard a buzz of wings overhead. I glanced up to see a hummingbird pass over, and followed the bird with my eyes as it flew directly to a nest in an elm tree just across the stream from me. I immediately recrossed the creek and took up a position almost directly beneath the tree, where I could see the parent bird feeding two young almost as large as itself. Indeed, upon returning to the place about noon the next day I found the nest empty, the family evidently having departed of their own free will. The nest was placed upon a small horizontal branch of an elm tree, about twenty feet up, and out near the end of a main limb. The nest was inaccessible without a ladder, hence I could not collect it. I found the hummingbird a fairly common resident of the territory, sometimes noting as many as four or five individuals in the course of a day's tramp.

NORTHERN WATER-THRUSH (*Sciurus noveboracensis noveboracensis*). I heard the song of this species but twice after reaching this field in mid-July. It is one of the group that ceases singing early in the summer. It is partial to low, boggy ground, and keeps well hidden among the brakes and ferns of the wet swamp (Fig. 71). It blends so well with its surroundings that, unless it be flushed, it is readily overlooked. It is a very nervous bird, however, and becomes highly excited at the least disturbance or intrusion.

The call note is a high-pitched chirp differing from most bird calls, except perhaps that of the mourning warbler which is often found in the same habitat. The bird has a habit of bobbing its tail up and down as it walks along or perches, a characteristic that should not fail as a means of identification.

MOURNING WARBLER (*Oporornis philadelphia*). The term "mourning" is a misnomer so far as the disposition of this bird is concerned, for during the breeding season it is a tireless producer of a sprightly musical, whistling call suggestive of a tinkle or bubbling of water over a pebbly course. The bird is difficult to see as it remains hidden in the dense cover of the swamp floor, seldom showing itself unless it comes out in defense of its nest. The bird is a rather bright yellow, but with a dark gray throat shading almost to black on the breast, a marking suggestive of a mourning veil, which is responsible for the bird's name.

CANADA WARBLER (*Wilsonia canadensis*). This is the most common warbler of the entire area, and in some portions may almost be classed as abundant. I saw fourteen, one day, on a half-mile walk through a certain portion of timber just below Labrador Pond.

Birds of this species are very musical in the early mornings, and were still in song when I left the field on August 15. They are birds of the underbrush and low trees and are rather more bold than most warblers, often allowing a close approach. The distinctive field mark is a black necklace across a bright yellow breast. The back is a bluish gray, and this rather plain color contrasts markedly with the bright yellow below.

WINTER WREN (*Nannus hiemalis hiemalis*). The winter wren is a sprightly little creature, more often heard than seen, whose little long-drawn melodious warble, while not given continuously, may be heard from some brushy thicket or old fallen tree-top, at intervals throughout the day. It is a common bird of this tract. The bird seems to spend some time near the ground feeding, then mounts to a bit of shrubbery a few feet above the ground and sings for half or three-quarters of an hour, thereupon returning to its feeding

activities. The short tail, perked up at an acute angle with the back, gives the bird a very pert appearance, the sauciest of the family.

BROWN CREEPER (*Certhia familiaris americana*). The brown creeper, while not especially common, is found occasionally in the heart of the swamp where its faint, lisping notes may be heard as it urges its way up a tree, peering into the crevices and crannies of the bark, in search of morsels overlooked by the nuthatch or woodpecker. Unless the bird moves it can scarcely be distinguished against the background of the tree upon which it is found, for his streaked brown and black plumage harmonizes so well with the furrows and corrugations of the bark that it seems to be but a part of the tree itself.

WILSON'S THRUSH (*Hylocichla fuscescens fuscescens*). This thrush had discontinued his concerts for the season when I arrived on the field, it being one of the first song birds to go into retirement in this sense. Its call-note could be heard, however, as one passed through the woods and suddenly disturbed its meditations. I have referred at other times to Dr. Henry Van Dyke's beautiful poem on the song of the veery, but he as a poet reads a quality into the song that escapes me, and I do not think the song of this bird can compare with that of the wood thrush. Favorite choice in bird songs is an individual matter, of course, and we can hardly be expected each to have the same favorite. The song of the Wilson's thrush or veery has an elusive, mysterious quality which is really beyond description; a hollow, peculiar sound, as if the bird had its head in a hollow log or a pipe. It has a peculiarly weird sound when heard in the hush of twilight, when it seems invested with a quality that it lacks in the bright light of the summer day.

HERMIT THRUSH (*Hylocichla guttata pallasi*). The three thrushes found in the Labrador Pond area were apparently about equal in numbers. The wood thrush frequented the larger timber, while the Wilson's and the hermit thrushes sought the denser woods of the swamp. The song of the hermit thrush is difficult to describe, having some of the qualities of both the Wilson's thrush and the wood thrush. It sang more than did either of the other two, perhaps more than the two combined, for it sang much later into the forenoon and resumed earlier in the evening than they. The hermit thrush is the most difficult one to observe and I caught but fleeting glances of it on a very few occasions. It is a dull brown on the back, with the tail a rich russet tinge which serves to distinguish it from other members of the genus. It is silent on migrations and will be found in song only in its summer home.

Birds of the Open Slough. The only open slough in the area covered about forty acres and was found just east of the village of Tully, and mostly on the north side of the right-of-way of the Delaware, Lackawanna and Western Railway tracks (Fig. 72). This area was grown thickly with sedge and other swamp grasses, the roots of these being in water from one to three feet in depth. There were occasional open places in the middle of the slough caused by the passage of a small stream. Besides the grasses found here which are indigenous to such a habitat, there were a few flowering plants which were not found elsewhere: the wild iris, cardinal flower and turtle-head. The slough was rich in bird life of the kinds peculiar to this habitat only. No other habitat in the area yielded as great a variety of bird life, for besides the characteristic species, many birds from other habitats came here to feed on the myriads of insects which swarmed over the water. The fences and telephone wires were lined with birds which would dart out after a passing insect, or fly for a time over the water hunting them. The list here given includes most of those which do not strictly belong to the habitat under consideration, but which were present in considerable numbers at various times. Those belonging properly to this habitat I shall in the following paragraphs discuss individually, while the others are merely listed here: green heron, Wilson snipe, killdeer, ring-necked pheasant, kingfisher, chimney swift, kingbird, phoebe, crow, bronzed grackle, starling, goldfinch, song sparrow, barn swallow, cliff swallow, rough-winged swallow, bank swallow and bluebird. The Wilson snipe and the killdeer while belonging more or less fittingly in a habitat such as this were far from common and were seen only a few times; therefore I did not consider them important enough for special mention in connection with this habitat.

AMERICAN BITTERN (*Botaurus lentiginosus*). The bittern was a denizen of the slough and I saw one or two individuals practically every time I passed the place. These birds are rather timid and will take flight rather easily, but if they do not make a movement while on the ground they are very difficult to distinguish among the dead grasses and sedges. Their brown and black streaked body blends so closely with the surrounding vegetation as to seem almost a part of it. A characteristic pose of the bird when finding itself observed is to stand perfectly still with the neck outstretched and bill pointing skyward. This tends more effectively to obliterate it amidst its surroundings. While I can not verify this from any personal experience, these birds are said to be extremely bold and vicious in defense of their nest, the female remaining spread out on the nest

much after the manner of a brooding hen, with her sharp bill upraised in a menacing attitude. A child, especially, should not approach close enough to such a bird to be within reach of a thrust from its dangerous beak.

CAROLINA RAIL (*Porzana carolina*). Rails were often heard calling in the slough as I passed by, but on only one occasion did I catch sight of one. The grass along the railroad right-of-way had been recently mowed with a scythe, and as I walked up the railroad I surprised a rail feeding out in the open. The bird scurried quickly into the slough but not before I was able to identify it as the sora. This is excellent cover for rails, and it is very probable that the Virginia rail also may be found here, and possibly at times even the king rail.

MARSH HAWK (*Circus hudsonius*). One pair of marsh hawks was noted on the domain. They were located a mile south of the village of Apulia, and just north of the glacial evidences mentioned in the General Description of the area. There was an open slough with a small pond in this locality. Three or four of these hawks were seen at the same time, so it was evident that they were a brood of the season. The white rump, seen as these hawks fly from the observer, or across his front, is the conspicuous field identification mark, and one not easy to overlook as the birds usually fly low or near the ground much of the time. They do, however, in the fall of the year, also soar at times much after the fashion of the red-tailed hawk. The difference can be noted in the long tail and long narrow wings of the marsh hawk in contrast with the broad wings and fan-shaped tail of the other species. The marsh hawk is considered by economic ornithologists to be a valuable bird to the farmer, as it subsists largely on small rodents and cottontail rabbits.

TRAILL'S FLYCATCHER (*Empidonax trailli trailli*). Traill's flycatcher is the most common of the family to be found in the slough, as well as in the alder thickets along the edges of the open swamp. I found it in this territory most common in the alders just south and west of the milk station at Apulia, and although this species had stopped singing by the latter part of July, its little call notes could be heard at irregular intervals.

RED-WINGED BLACKBIRD (*Agelaius phoeniceus phoeniceus*). This was the most abundant bird of the sloughs during the early part of the summer, but toward the first of August they began to leave, until by the middle of the month only a few dozen were left. There is no more striking bird to be seen afield. The glossy black of the male

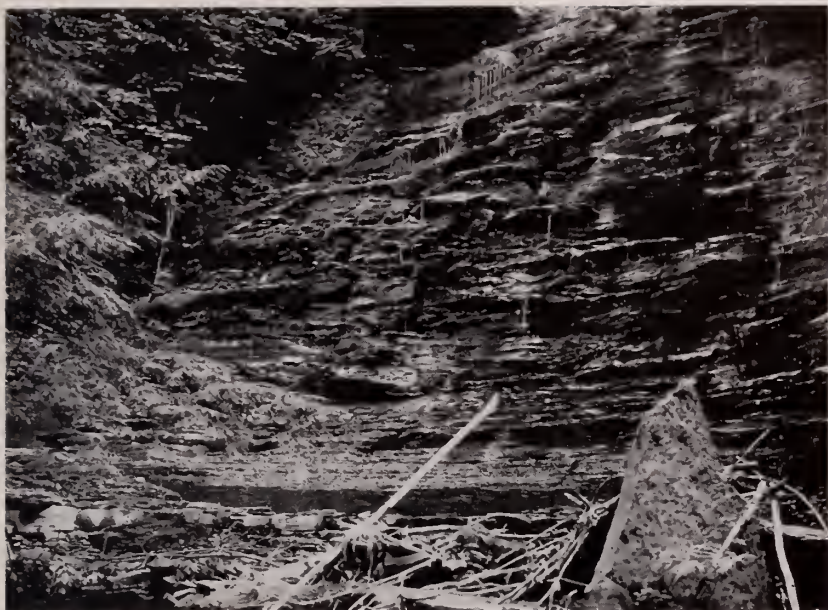


Fig. 69. Loose shale and vegetation are washed away, revealing a wall of irregular rock as this stream trickles down the hillside. Arched over by leafy hardwoods, a wealth of shade forms a cool retreat for birds during July and August heat. July 28, 1927.



Fig. 70. The oven-bird, the water-thrush and the veery call from the cool retreat of these shadowed rills, while overhead flit redstart, scarlet tanager and black-throated green warbler. July 28, 1927.



Fig. 71. View of the swamp ground a mile south of Labrador Pond. Here the hummingbird nested and the woodcock was flushed. Other birds: winter wren, wood pewee, hermit thrush, mourning, canada and black-throated blue warblers, white-breasted nuthatch, brown creeper, chickadee, sapsucker, oven-bird, water-thrush and broad-winged hawk. August 4, 1927.



Fig. 72. Tully marsh, adjoining the village of Tully on the east. Birds of this habitat: short-billed marsh wren, red-winged blackbird, bittern, green heron and Wilson's snipe. Barn and cliff swallows swooped over this place, feeding on insects. August 10, 1927.

set in relief by the golden and red bars on the wings make him a thing of beauty. His soberly colored, streaked little wife—or perhaps I should say wives, for he is a polygamist of the deepest dye—would not be thought to belong to the same species at all. One male red-wing will father half a dozen or more nests, which accounts for the great excess of females seen on the nesting grounds. They are not the least timid in the defense of the nest, and will poise over the intruder uttering harsh “chacks” of alarm and anger. The nest is commonly placed very near the water, and usually in a low bush or in the top of a tussock of dead grass or sedge.

BOBOLINK (*Dolichonyx oryzivorus*). By the time I came to this field the bobolink had largely left the breeding ground in meadow and pasture and was congregating in considerable flocks in the slough, where I found it in the company of red-winged blackbirds, bronzed grackles and starlings. A few of the males still retained their wedding garb, but many were in the midst of the change. The birds were not musical beyond a subdued “chack” of a type with the alarm calls of this family. In the early flocking of the bobolinks we see an example of what is the general rule in its family (the blackbird family); and this flocking we have come to recognize as one of the early signs that autumn is approaching.

SWAMP SPARROW (*Melospiza georgiana*). The swamp sparrow is one of the most common as well as one of the most vociferous birds of the marsh. His song easily becomes monotonous since it is given throughout the entire day and in the hottest of weather. Relief comes, however, with the beginning of August, when he stops his singing except for a brief concert in the early morning. The swamp sparrow is, to my mind, the most richly dressed of the sparrows, being a soft, reddish brown above, mixed with occasional black streaks. It is rather shy and retiring, preferring usually to remain in the recesses of the dead grass of the marsh, but coming forth when the occasion demands in agitated defense of its nest and nesting ground.

MARYLAND YELLOW-THROAT (*Geothlypis trichas trichas*). This is one of the commonest birds of the marsh and the low, pastured bushy lands, but is one of the least often seen, as it keeps well down in the cover. Its call of “witchery, witchery,” sometimes three and sometimes four times repeated, is a very characteristic song and familiar to many who may not know the bird itself. About the same size as most warblers, this little yellow bird is marked by black cheeks which will distinguish it from any other bird of this family. I have heard

it said that it has a marked preference for skunk-cabbage as a nesting site, in areas in which this plant abounds, evidently being indifferent or insensitive to the evil odor. This odor might, conceivably, have some protective value for the nesting place.

SHORT-BILLED MARSH WREN (*Cistothorus stellaris*). The drab, squeaky chatter of this wren is one of the most common calls issuing from the grassy marshes. It is as hard to sight as the rails which creep about among the sedges, though its calls are incessantly heard. Upon being flushed the bird will fly but a short distance and then drop suddenly into the marsh, where its chattering may be heard as it bustles about with its eye ever upon you, seeing but unseen.

Birds of the Upland Thickets. The upland thickets were composed mostly of various species of thorn apple (*Crataegus*), with some pin cherry, and scattered seedling trees of various sorts (Fig. 74). The bird life here was less abundant, since the area was quite dry, and few birds are generally found away from water. The species breeding here are, however, those typically for such habitats. Others which are seen here occasionally but do not characteristically belong to the habitat are as follows: kingbird, blue jay, vesper sparrow, slate-colored junco, chipping sparrow, song sparrow, cedar wax-wing, black-throated green warbler, chickadee, robin and bluebird. The typical species for this habitat are the following:

FIELD SPARROW (*Spizella pusilla pusilla*). The cheerful whistle of this species is heard throughout every day of the summer. Field sparrows are common in brushy pastures and upland thickets. While having the generally known "sparrow" color, brown and gray streaked, they are of a lighter reddish brown than many others of the family, and the bill is decidedly pinkish. They nest near the ground and are among those birds which suffer from the parasitism of the cowbird. Although the field sparrows generally stop singing in August, they remain in the neighborhood of their summer home until October before starting the southward journey.

TOWHEE (*Pipilo erythrophthalmus erythrophthalmus*). The towhee was not a common bird in any part of the territory as a whole, but one or two pairs were to be found in each area of upland thicket. More individuals were seen at the entrance of Tinker Falls valley than at any other place (Fig. 68). They stopped singing about the first of August, after which only the call notes of "towhee" or "chewink" were to be heard. These birds have a rather musical song which they here sing from the top of a scrubby oak or thorn-bush in early morning and toward evening, but they sing little through the middle of the day.

INDIGO BUNTING (*Passerina cyanea*). The indigo bunting was quite common in this habitat. Its song—resembling somewhat the syllables “zee-zee-zing-zing jingle-jingle-jingle,” the first two notes being rather high pitched, the next two a trifle lower, each of the four with a rather sharp accent, and the last three on a descending scale—was flung out at intervals from some weed or low bush at any time of day. The birds did not sing much after July 25, but their sharp, metallic call notes early apprised one of their presence. The steely blue plumage has a metallic luster in the sunlight, which is so pronounced that it is difficult to see the brown on the wings at such times. The female is of a brownish color with only a suggestion of the blue that sets off her lord and master. I have found the cowbird’s egg also in the nest of this species, which is placed in a low bush, near the ground.

CATBIRD (*Dumetella carolinensis*). The catbird is common both in the upland thickets and in the heavier ones at the edge of the woods and of the swamps; so it may be said to belong to two habitats, with about an equal preference for each. The birds had stopped singing and I heard only the cat calls after my arrival on this field in middle of July. The catbird builds a bulky nest, largely of twigs, and lined with rootlets, which is usually placed at low elevations, although I once found one in a Russian olive tree which was some fifteen feet above ground.

BROWN THRASHER (*Toxostoma rufum*). The thrasher is closely related to the catbird and resembles it in many ways. This is the “brown thrush” of common parlance, but it is not a thrush at all. Its song is more brilliant than that of the catbird, and exhibits more regularity. The nesting sites and the nest are very similar and some calls given in defense of the nest are practically identical, especially a very sharp whistle, with certain ones of the catbird. There is quite a variety in the manner of the thrasher’s defense of its nest. A nest that is in the bosom of a thorn-bush is reasonably well protected by its very location, and the birds will often not make nearly so much fuss at intrusion as they do when the nest is in a more exposed place and easily within reach of the hand. I have found the nest on the ground occasionally, but it is usually placed in a gooseberry bush or crabapple tree. In the Labrador Pond territory I found the thrasher in but one location, and that was in a small thicket at the north end of the West Hill.

Birds of Shade Trees and Buildings. We have here the birds which show a preference for the vicinity of human habitations, finding nesting places in or about buildings, or in cultivated trees or shrubs. Some of the birds discussed here do not nest in trees at all, but prefer the more artificial habitations of nest boxes, chimneys, etc., if available. This habitat presents generally a considerable variety of bird life, but there are usually some species that may be far from common or even limited to but one or two pairs, perhaps, in an entire village. These less common forms are here mentioned to make the list more nearly complete for this habitat, although they are not of sufficient importance to discuss individually. These are: mourning dove, screech owl, downy woodpecker, wood pewee, Baltimore oriole, purple finch, goldfinch, rose-breasted grosbeak, warbling vireo, red-eyed vireo, yellow-throated vireo, chickadee and bluebird. Some of these, it will be noted, are discussed in relation to other habitats to which they more properly belong.

FLICKER (*Colaptes auratus luteus*). This common species, which in this vicinity is known also by the name of high-hole, and yellow-hammer, is one of the most valuable of the group economically. They are voracious eaters of insects, especially of ants, a pair of flickers being capable of cleaning up an entire ant colony in a surprisingly short time. They are also more or less belligerent birds which aid materially in keeping the English sparrow in check. The flash of bright yellow and the conspicuous white rump are the reliable field marks when the bird is in flight. The flight is that characteristic of woodpeckers of all species, an undulating, up and down movement, which may be recognized a great way off.

CHIMNEY SWIFT (*Chatura pelagica*). The twitter of the chimney swift, or "chimney swallow" as it is often popularly known, is a familiar sound heard overhead in villages on summer evenings, and a few are frequently found also about farm buildings. The creature itself scarcely looks bird-like as it wings the air with short, rapid wing beats, but rather bat-like, and it is an interesting specimen to have in the hand. The color is sooty grey, the wings are long and tapering, adapted to rapid flight and sudden turns in the air; and the tail is short, with the middle rib of each feather ending in a stiff spine which serves to hold the bird in its customary perching position against the side of a chimney. The mouth is wide and gaping, "from ear to ear," which makes it easy to secure the insect food which the bird seizes while on the wing. So far as I am aware the bird almost never perches except in a chimney. The nest is plastered

against the brick of the chimney and is composed of twigs stuck together by a mucilaginous secretion of the salivary glands. The twigs are not plucked from the ground, but dexterously snapped off from some dead branch of a tree as the bird flies past.

BRONZED GRACKLE (*Quiscalus quiscula aeneus*). This is the common blackbird of everyday language. The bird is partial to coniferous trees in nesting time and a flock of them may then take possession of all such trees found in some yard. They are noisy birds and a flock of them frequently becomes a nuisance, for none of their squeaky calls and "chacks" can be called musical in the least. The males are, however, rather handsome birds with their iridescent purplish heads and bronzed back and tail. The young leave the nest early in June, after which both old and young depart and take to roving around the country, gradually receiving additions to their flock or joining others, till by autumn hundreds are sometimes assembled ready for flight southward.

STARLING (*Sturnus vulgaris*). The starling is becoming very numerous in this entire section of the State, and I think the time is not far off when it will become an actual pest. It is well recognized among biologists that the introduction of a bird into a region to which it is not indigenous may produce unexpected results. It may get no foothold at all, or if it does it may become such a nuisance through the upsetting of the natural balance previously existing that its introduction thereupon becomes a thing very much to be regretted. Like the English sparrow the starling nests in crevices and corners of buildings, holes in trees and like sites. Unlike that sparrow, however, it usually nests at some altitude, sometimes occupying a woodpecker hole high up in an elm or maple. The young in the nest are extremely noisy and lead one readily to their discovery. The starling is easily recognizable in flight because of its long wings and short tail. I recall that when I saw my first starling, I thought it a bird that had met with an accident in which it had suffered the loss of its tail. The birds make a great variety of noises, few of which can be considered musical.

CHIPPING SPARROW (*Spizella passerina passerina*). The chipping sparrow is one of the commonest shade tree birds, a pair—and sometimes more—being found on practically every block in the village. They are very sociable little creatures and often will nest in the decorative shrubbery of the front yard or in bushes set directly against the house. Their nests are invariably lined with horse hair, which has earned for the species the name "hair bird" in some localities,

Their song is a rather monotonous "chippy-chippy-chippy-chippy-chippy," repeated over and over in the same tone. The distinguishing mark is the rich reddish crown bound by a black band over each eye.

CEDAR WAXWING (*Bombycilla cedrorum*). These somewhat mysterious appearing little birds are attractive in any environment. They are very soberly yet beautifully dressed in an olive-brown which is quite uniform over the body. The tail ends with a yellow band, and the head is surmounted by a conspicuous pointed crest. The birds are silent except for a very soft, thin lisping note which can be heard but a short distance away. They nest in coniferous, or orchard trees, after most birds have finished, for it is the middle of the summer before they begin building. The birds are very erratic and nest wherever summer happens to find them. They seem to have no set home to which they return year after year, but lead a more or less nomadic life, wandering from place to place, irrespective of climatic conditions, for if food is plentiful they are as common in winter as in summer.

YELLOW WARBLER (*Dendroica aestiva aestiva*). The yellow warbler was not what may be termed common over any part of the area, but seemed most in evidence in the villages of Tully and Apulia where it lingered about hedges and garden trees. It had passed its period of song by the time I arrived on the field. It is the bird which shares with the goldfinch the name of "wild canary," given it usually by school children. It is a golden yellow all over, with faint brownish streaks on the sides, which cannot be seen except with a field glass or at close range. This bird is often the victim of the parasitic habits of the cowbird, and so far as I know, is the only one that may be said to circumvent that bird. When confronted by the egg of the intruder in its nest it builds another floor over the foreign egg, extends the walls of its nest a little higher, and continues with its nesting. The nest may be visited again by the cowbird, when the same action is repeated. Nests of the yellow warbler have been found that were from three to six stories in height, representing successive visits of the cowbird. But this behavior of the yellow warbler, according to Herrick, is to be looked upon as an instinctive reaction, brought about by a disturbance at a certain point in its breeding cycle, rather than as an act of intelligence.

HOUSE WREN (*Troglodytes aëdon aëdon*). The only house wrens found were in the village of Tully. These birds, in ill favor with some persons, will keep their place very well if not given undue encouragement, and will get along with their feathered neighbors so



Fig. 73. Pitcher plant in quaking bog on east edge of Labrador Pond. In this environment also are found showy lady's slipper in season, while the larger vegetation contains much tamarack and high-bush blueberries. Maryland yellow-throat, blue-headed vireo and hermit thrush found here. August 5, 1927.



Fig. 74. View of upland thicket and meadow a mile east of Labrador Pond and on the plateau. Habitat of catbird, savannah sparrow, indigo bunting, field sparrow, towhee, bluebird and robin. August 6, 1927.

long as they are few in numbers. But let them become dominant on a town lot and the wrens are all one will be likely to have. Small in body, they have the combativeness of the red-headed woodpecker or the blue jay. I have referred to the upsetting of the balance in nature in connection with the introduction of the starling. This can be done also with any other form if encouraged to reproduce greatly in excess of its normal numbers in a restricted locality. The house wren has long been regarded sentimentally for his excessive good humor and his bubbling enthusiastic song, and many people are hard to convince in regard to his less desirable traits. I would not have him exterminated; only that he be let alone, as we let the robins, orioles, warblers and other species alone, and it will take care of itself so far as its natural numbers in a given locality are concerned.

ROBIN (*Planesticus migratorius migratorius*). There is no need of going into detail on this most American of song birds. One of the first harbingers of spring, the presence of the first robin indicates that the back-bone of winter is finally broken, even though we may be visited later with occasional squalls and cold snaps. The jolly, rollicking evening song of the robin as given from telephone wire, house-top or steeple is an inspiration to many, and it is always with a sense of pride that one says, "We have a robin's nest by our window," even though it be a commonplace occurrence.

Birds of Open Field and Roadside. The roadside birds seem the most sociable of all, as they fly up from their dust bath in the road before one, or sit on the fence or telephone wires as one passes by. What drive into the country is not given added pleasure by the sight of a cock ring-necked pheasant crossing the road in all his splendor, or of the hen with a brood of tiny young fluttering after her. A flicker squawks from a pole or dips away in undulating flight, his yellow wings flashing at every dip, his white rump a beacon that all eyes can follow. An occasional red-headed woodpecker on a fence-post does not fly as one approaches, but drops down the post till he is out of sight, then maneuvers skillfully to keep himself always on the opposite side of the post from the observer. A prairie horned lark darts up from the road to fly further ahead and drop into the road again, or to glide over the fence into the adjacent meadow. A bobolink trills from the wing as he dives into the meadow, or a cow-bird squeaks at you from the next fence or pasture. These are some of the occasional birds seen along the country highway, and which shall be mentioned only as above for the present, since they are given further attention under other headings. But there are certain

other species which are peculiarly residents of the open fields, and these deserve particular mention.

KILLDEER (*Oxyechus vociferus*). This noisy but beautiful bird is found in every cornfield in the Labrador Pond region, where it lays its four eggs in a little depression made next to a hill of corn. Although we consider them shore birds, killdeers often retire some distance from water to rear the young. The young are precocial and able to run and pick food as soon as they are hatched and dry. They are beautiful little things, looking like tiny long-legged chickens, but they can out-peep the most vigorous chick of their size, and when in distress drive their parents into frenzied spasms of excitement. They are fleet runners, and it takes a deal of wind and energy to overtake one. The adults seem rather fearless, yet they never trust man, and are vociferous in their protests at his approach.

SPARROW HAWK (*Cerchneis sparverius sparverius*). This is one of the most beautiful and dainty of all the hawks. Its rich reddish brown outshines the blue-gray with which it is barred, and its iridescence makes it appear practically a solid color. The black markings or bridlings of the head give a beautiful effect. These fearless little hawks are found frequently along roadsides and the railroad rights-of-way. They are not injurious to game because of their small size, and while they at times seize upon a small bird, their main bill of fare is mice, grasshoppers and small "vermin" of various sorts. Seldom is an individual seen singly; they are usually in pairs, and towards the end of the summer an entire family may be strung along the road for some distance. This bird was seen at intervals between Labrador Pond and Tully.

KINGBIRD (*Tyrannus tyrannus*). This noisy individual is a common roadside friend. He spends much time perching on a fence or telephone wire from which he makes frequent sallies out into the air after some passing insect. He is almost black on the back, being slightly streaked with gray, and practically pure white below. This real cause for pride in plumage marking can not be seen in the field except on rare occasions, and consists of a brilliant ruby patch in the center of the crown, which is disclosed only during mating activities. The bird is very bold and belligerent and has an especial antipathy toward crows and hawks, against which he will rush valiantly the moment they come within his territory. The species is known in some localities as the "bee martin" through the supposition that honey bees form a large part of its diet; but if it does eat bees on occasion, I think perhaps this luxury is well earned through its attacks on various noxious insects which come its way.

PHÆBE (*Sayornis phæbe*.) Every old barn or deserted dwelling along the roadside has its nest of phæbes, either on a porch, a joist, or over a doorway or window, and is common in the area here discussed. These gentle little birds are purely insectivorous in their food habits and a great asset economically. They often raise two broods in a season, with usually five to the brood. The nest is an interesting structure, rather bulky, and is built of mosses, lichens, fine roots and horsehair. These birds will return to a locality year after year and sometimes use the same nest, building a new floor and adding to the sides. Occasionally nests are discovered which have been in use for four or five seasons. A distinguishing characteristic of this species is the vigorous and irregular bobbing of the tail while the bird is at rest. The bobbing is most frequent immediately after the bird alights, slowing down if it remains for some time on the perch.

MEADOWLARK (*Sturnella magna magna*). The meadowlark was heard singing only occasionally after I had come to this field. I was surprised, in view of the fact that so much land was hay meadow, that the species was not more common; but eight or ten individuals, I found, were all that I could expect to see on a day afield. The song of this bird, like that of the robin, is one of the first heard in the spring; and the bird often comes early enough to have to wade in snow a few times after his arrival. I, who have been more accustomed to the brilliant and varied song of the western meadowlark, found it hard to sense much music in the "cheaper" sounding notes of this species. There is indeed a great difference in the song of the two species, that of the eastern meadowlark being much slurred, while that of its western relative is vastly more rippling and broken.

GOLDFINCH (*Astragalinus tristis tristis*). This is the bird which perhaps most commonly carries the popular cognomen of "wild canary." The goldfinch is a very dapper little gentleman with his rich golden body color accentuated by his black crown, wings and tail. He possesses one of the most cheerful notes heard in the field, with his delicate little lisp given on an ascending scale, and corresponding somewhat to the word "swe-e-e-t" rather long drawn out. His song, however, is very chattery and broken, and I can recall times when I have confused it with that of the indigo bunting. The goldfinch nests very late, often not before the first of August. The nest, usually lined with the down of milkweed or thistle, is placed in a tree or a bush, but sometimes in a milkweed or thistle plant. Toward the fall the male changes his brilliant plumage, putting on the olive-greenish costume of the female.

VESPER SPARROW (*Poocetes gramineus gramineus*). The song of the vesper sparrow is quite as pleasing to me as that of the song sparrow. It is much of the same character but less broken. The distinguishing field mark of this little brownish red shouldered sparrow, is the white of the two outer tail feathers, seen when the tail is spread in flight. The bird is terrestrial in the fullest sense, loving flat surfaces, and seldom gets higher than the fence-post from which he pours forth his song, although I have at times seen him perching on the telephone wires or on a small tree by the roadside. The nest is placed on the ground, and the adult bird will seldom flush from it until she is nearly stepped upon. The birds are fond of dust baths in the road, and it is a common occurrence to frighten two or three from one place while they are thus indulging themselves.

SAVANNAH SPARROW (*Passerculus sandwichensis savanna*). I heard the "zip-zip-zip-zee-e-e-e-eee" of this bird but a few times after I reached this field, but the bird was seen in numbers on fence wires and in the meadows. It is perhaps the commonest field bird of this territory, and is found in considerable numbers in every hay meadow so long as the grass remains uncut. The song of this sparrow is weak and monotonous, but during its season is given throughout the hottest part of the day with never ending enthusiasm. The nest is placed on the ground in a tuft of grass and is very difficult to find, as on the approach of the intruder, the female will leave the nest and run along for some distance through the grass before taking wing. One is, therefore, hardly likely to find a nest by noting where the bird flew out.

BLUEBIRD (*Sialia sialis sialis*). I place the bluebird under the heading of Birds of the Roadside because of its partiality for old fence posts as nesting sites quite as frequently as for orchard trees. The birds characteristically will sit on the fence till one approaches, then fly further on, alighting again and again for some distance, until their curiosity apparently has been satisfied, when they will fly back to their original location. They are rather fearless birds and often the female will sit on the nest while an observer is looking down upon her from a distance of no more than a foot. Her little eyes will sparkle, but no move will be made indicative of her terror. The bluebird is also one of the spring birds, and his song will then often come from the blue above when he himself can be located only with difficulty.

LIST OF BIRDS FOUND IN LABRADOR POND REGION

The birds in this list include not only those found while the writer resided on the area for the purpose of the present survey, but also species which were seen on subsequent visits and at other seasons of the year.

1. Pied-billed Grebe.... *Podilymbus podiceps* (Linn.)
2. Black Duck..... *Anas rubripes* Brewst.
3. American Bittern.... *Botaurus lentiginosus* (Montag.)
4. Great Blue Heron... *Ardea herodias herodias* Linn.
5. Green Heron..... *Butorides virescens virescens* (Linn.)
6. Woodcock *Philohela minor* (Gmel.)
7. Wilson's Snipe..... *Gallinago delicata* (Ord)
8. Spotted Sandpiper... *Actitis macularia* (Linn.)
9. Killdeer *Oxyechus vociferus vociferus* (Linn.)
10. Ruffed Grouse..... *Bonasa umbellus umbellus* (Linn.)
11. Ring-necked Pheasant *Phasianus torquatus* Gmel.
12. Mourning Dove..... *Zenaidura macroura carolineusis* (Linn.)
13. Marsh Hawk..... *Circus hudsonius* (Linn.)
14. Sharp-shinned Hawk. *Accipiter velox* (Wils.)
15. Cooper's Hawk..... *Accipiter cooperi* (Bonap.)
16. Red-tailed Hawk.... *Buteo borealis borealis* (Gmel.)
17. Red-shouldered Hawk *Buteo lineatus lineatus* (Gmel.)
18. Broad-winged Hawk. *Buteo platypterus platypterus* (Vieill.)
19. Pigeon Hawk..... *Falco columbarius columbarius* Linn.
20. Sparrow Hawk..... *Falco sparverius sparverius* Linn.
21. Barred Owl..... *Strix varia varia* Barton.
22. Screech Owl..... *Otus asio asio* (Linn.)
23. Great Horned Owl... *Bubo virginianus virginianus* (Gmel.)
24. Yellow-billed Cuckoo. *Coccyzus americanus americanus*
(Linn.)
25. Black-billed Cuckoo.. *Coccyzus erythrophthalmus* (Wils.)
26. Kingfisher *Ceryle alcyon alcyon* (Linn.)
27. Hairy Woodpecker... *Dryobates villosus villosus* (Linn.)
28. Downy Woodpecker. *Dryobates pubescens medianus*
(Swains.)
29. Yellow-bellied Sap-
sucker *Sphyrapicus varius varius* (Linn.)
30. Flicker *Colaptes auratus luteus* Bangs
31. Nighthawk *Chordeiles virginianus virginianus*
(Gmel.)

32. Chimney Swift..... *Chaetura pelagica* (Linn.)
33. Ruby-throated Hum-
mingbird *Archilochus colubris* (Linn.)
34. Kingbird *Tyrannus tyrannus* (Linn.)
35. Crested Flycatcher... *Myiarchus crinitus* (Linn.)
36. Phœbe *Sayornis phæbe* (Lath.)
37. Wood Pewee..... *Myiochanes virens* (Linn.)
38. Traill's Flycatcher... *Empidonax trailli trailli* (Aud.)
39. Prairie Horned Lark. *Otocoris alpestris praticola* Hensh.
40. Blue Jay..... *Cyanocitta cristata cristata* (Linn.)
41. Crow *Corvus brachyrhynchos brachyrhynchos*
Brehm
42. Starling *Sturnus vulgaris* Linn.
43. Bobolink *Dolichonyx oryzivorus* (Linn.)
44. Cowbird *Molothrus ater ater* (Bodd.)
45. Red-winged Blackbird *Agelaius phœniceus phœniceus* (Linn.)
46. Meadowlark *Sturnella magna magna* (Linn.)
47. Orchard Oriole..... *Icterus spurius* (Linn.)
48. Baltimore Oriole.... *Icterus galbula* (Linn.)
49. Bronzed Grackle..... *Quiscalus quiscula æneus* Ridgw.
50. Goldfinch *Astragalinus tristis tristis* (Linn.)
51. Pine Siskin..... *Spinus pinus* (Wils.)
52. English Sparrow.... *Passer domesticus domesticus* (Linn.)
53. Vesper Sparrow..... *Poæcetes gramineus gramineus* (Gmel.)
54. Savannah Sparrow.. *Passerculus sandwichensis s a v a n n a*
(Wils.)
55. Grasshopper Sparrow *Ammodramus savannarum australis*
Mayn.
56. Henslow's Sparrow.. *Passerherbulus henslowi h e n s l o w i*
(Aud.)
57. White-throated Spar-
row *Zonotrichia albicollis* (Gmel.)
58. Tree Sparrow..... *Spizella monticola monticola* (Gmel.)
59. Chipping Sparrow... *Spizella passerina passerina* (Bech.)
60. Field Sparrow..... *Spizella pusilla pusilla* (Wils.)
61. Slate-colored Junco.. *Junco hyemalis hyemalis* (Linn.)
62. Song Sparrow..... *Melospiza melodia melodia* (Wils.)
63. Lincoln's Sparrow... *Melospiza lincolni lincolni* (Aud.)
64. Swamp Sparrow..... *Melospiza georgiana* (Lath.)
65. Towhee *Pipilo erythrophthalmus erythrophthal-*
mus (Linn.)

66. Rose-breasted Gros-
beak *Zamelodia ludoviciana* (Linn.)
67. Indigo Bunting..... *Passerina cyanea* (Linn.)
68. Scarlet Tanager *Piranga erythromelas* Vieill.
69. Purple Martin..... *Progne subis subis* (Linn.)
70. Cliff Swallow..... *Petrochelidon lunifrons lunifrons*
(Say)
71. Barn Swallow..... *Hirundo erythrogaster* Bodd.
72. Bank Swallow..... *Riparia riparia* (Linn.)
73. Rough-winged Swal-
low *Stelgidopteryx serripennis* (Aud.)
74. Cedar Waxwing..... *Bombycilla cedrorum* Vieill.
75. Red-eyed Vireo..... *Vireosylva olivacea* (Linn.)
76. Warbling Vireo..... *Vireosylva gilva gilva* (Vieill.)
77. Yellow-throated Vireo *Lanivireo flavifrons* (Vieill.)
78. Blue-headed Vireo... *Lanivireo solitarius solitarius* (Wils.)
79. Black and White War-
bler *Mniotilta varia* (Linn.)
80. Yellow Warbler..... *Dendroica aestiva aestiva* (Gmel.)
81. Black-throated Blue
Warbler *Dendroica caerulescens caerulescens*
(Gmel.)
82. Magnolia Warbler... *Dendroica magnolia* (Wils.)
83. Chestnut-sided War-
bler *Dendroica pensylvanica* (Linn.)
84. Black-poll Warbler... *Dendroica striata* (Forst.)
85. Black-throated Green
Warbler *Dendroica virens* (Gmel.)
86. Oven-bird *Sciurus aurocapillus* (Linn.)
87. Northern Water-
Thrush *Sciurus noveboracensis noveboracensis*
(Gmel.)
88. Mourning Warbler.. *Oporornis philadelphia* (Wils.)
89. Maryland Yellow-
throat *Geothlypis trichas trichas* (Linn.)
90. Canada Warbler..... *Wilsonia canadensis* (Linn.)
91. Redstart *Setophaga ruticilla* (Linn.)
92. Catbird *Dumetella carolinensis* (Linn.)
93. Brown Thrasher..... *Toxostoma rufum* (Linn.)
94. Carolina Wren..... *Thryothorus ludovicianus ludovicianus*
(Lath.)
95. House Wren..... *Troglodytes aëdon aëdon* Vieill.

96. Winter Wren..... *Naunus hiemalis hiemalis* (Vieill.)
97. Short-billed Marsh
Wren *Cistothorus stellaris* (Naum.)
98. Brown Creeper..... *Certhia familiaris americana* Bonap.
99. White-breasted Nut-
hatch *Sitta carolinensis carolinensis* Lath.
100. Chickadee *Penthestes atricapillus atricapillus*
(Linn.)
101. Golden - Crowned
Kinglet *Regulus satrapa satrapa* Licht.
102. Ruby-crowned King-
let *Regulus calendula calendula* (Linn.)
103. Wood Thrush..... *Hylocichla mustelina* (Gmel.)
104. Wilson's Thrush..... *Hylocichla fuscescens fuscescens*
(Steph.)
105. Hermit Thrush..... *Hylocichla guttata pallasii* (Cab.)
106. Robin *Planesticus migratorius migratorius*
(Linn.)
107. Bluebird *Sialia sialis sialis* (Linn.)

THE ROOSEVELT WILD LIFE MEMORIAL

As a State Memorial

The State of New York is the trustee of this wild life Memorial to Theodore Roosevelt. The New York State College of Forestry at Syracuse is a State institution supported solely by State funds, and the Roosevelt Wild Life Forest Experiment Station is a part of this institution. The Trustees are State officials. A legislative mandate instructed them as follows:

"To establish and conduct an experimental station to be known as 'Roosevelt Wild Life Forest Experiment Station,' in which there shall be maintained records of the results of the experiments and investigations made and research work accomplished; also a library of works, publications, papers and data having to do with wild life, together with means for practical illustration and demonstration, which library shall, at all reasonable hours, be open to the public." [Laws of New York, chapter 536. Became a law May 10, 1919.]

As a General Memorial

While this Memorial Station was founded by New York State, its functions are not limited solely to the State. The Trustees are further authorized to cooperate with other agencies, so that the work is by no means limited to the boundaries of the State or by State funds. Provision for this has been made by the law as follows:

"To enter into any contract necessary or appropriate for carrying out any of the purposes or objects of the College, including such as shall involve cooperation with any person, corporation or association or any department of the government of the State of New York or of the United States in laboratory, experimental, investigative or research work, and the acceptance from such persons, corporation, association, or department of the State or Federal government of gifts or contributions of money, expert service, labor, materials, apparatus, appliances or other property in connection therewith." [Laws of New York, chapter 42. Became a law March 7, 1918.]

By these laws the Empire State has made provision to conduct forest wild life research upon a comprehensive basis, and on a plan as broad as that approved by Theodore Roosevelt himself.

ROOSEVELT WILD LIFE BULLETIN, Vol. 3, No. 1. February, 1925.

1. The Birds of the Yellowstone National Park.....Milton P. Skinner.
2. Current Station Notes.....The Director and Editor.

ROOSEVELT WILD LIFE BULLETIN, Vol. 3, No. 2. March, 1925.

1. The Muskrat in New York: Its Natural History and Economics....
Dr. Charles E. Johnson.
2. Current Station Notes.....The Director and Editor.

ROOSEVELT WILD LIFE BULLETIN, Vol. 3, No. 3. September, 1926.

1. The Summer Birds of Central New York Marshes..Aretas A. Saunders.
2. Additional Notes on the Summer Birds of Allegany State Park.....
Aretas A. Saunders.
3. Current Station Notes.....The Director and Editor.

ROOSEVELT WILD LIFE BULLETIN, Vol. 3, No. 4. October, 1926.

1. The Economic and Social Importance of Animals in Forestry, with
Special Reference to Wild Life.....Charles C. Adams.
2. The Land—Economic Survey in Michigan.....R. A. Smith.
3. Current Station Notes.....Charles C. Adams.

ROOSEVELT WILD LIFE BULLETIN, Vol. 4, No. 1. October, 1926.

1. The Relation of Birds to Woodlots in New York State.....
Waldo L. McAtee.
2. Current Station Notes.....Charles C. Adams.

ROOSEVELT WILD LIFE BULLETIN, Vol. 4, No. 2. June, 1927.

1. The Predatory and Fur-bearing Animals of the Yellowstone National
ParkMilton P. Skinner
2. Current Station Notes.....Charles C. Adams

ROOSEVELT WILD LIFE BULLETIN, Vol. 4, No. 3. July, 1927.

1. A Trout Survey of Allegany State Park in 1922.....
William C. Kendall and Wilford A. Dence.
2. A Preliminary Survey of the Fish Life of Allegany State Park in
1921.....Thomas L. Hankinson.
3. Current Station Notes.....Charles C. Adams.

ROOSEVELT WILD LIFE BULLETIN, Vol. 4, No. 4. July, 1927.

1. The Beaver in the Adirondacks: Its Economics and Natural History...
Charles E. Johnson.

ROOSEVELT WILD LIFE BULLETIN, Vol. 5, No. 1. March, 1928.

1. A Preliminary Wild Life and Forest Survey of Southwestern Catta-
raugus Co., N. Y.....Victor H. Cahalane.
2. A Preliminary Report on the Trout Streams of Southwestern Catta-
raugus Co., N. Y.....Wilford A. Dence.

ROOSEVELT WILD LIFE BULLETIN, Vol. 5, No. 2. February, 1929.

1. The Fishes of the Cranberry Lake Region.....
W. C. Kendall and W. A. Dence.
2. The Story of King's Pond.....F. A. Lucas.
3. Its Fish Cultural Significance.....W. C. Kendall

ROOSEVELT WILD LIFE BULLETIN, Vol. 5, No. 3. September, 1929.

1. The Summer Birds of the Northern Adirondack Mountains.....
Aretas A. Saunders.
2. The Summer Birds of the Adirondacks in Franklin County, N. Y.....
Theodore Roosevelt, Jr., and H. D. Minot.

(Reprinted: original date of publication, 1877.)

ROOSEVELT WILD LIFE BULLETIN, Vol. 5, No. 4. August, 1930.

1. The Biology of the Voles of New York.....Robert T. Hatt
2. The Relation of Mammals to the Harvard Forest.....Robert T. Hatt

